S. HRG. 100-750

COMMERCIAL EXPENDABLE LAUNCH VEHICLE LIABILITY

HEARING

BEFORE THE

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

ON

COMMERCIAL EXPENDABLE LAUNCH VEHICLE LIABILITY

MAY 17, 1988

Printed for the use of the
Committee on Commerce, Science, and Transportation

U.S. GOVERNMENT PRINTING OFFICE

87-608 O WASHINGTON : 1988

S261-60

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ERNEST F. HOLLINGS, South Carolina, *Chairman*

DANIEL K. INOUYE, Hawaii
WENDELL H. FORD, Kentucky
DONALD W. RIEGLE, JR., Michigan
J. JAMES EXON, Nebraska
ALBERT GORE, JR., Tennessee
JOHN D. ROCKEFELLER IV, West Virginia
LLOYD BENTSEN, Texas
JOHN F. KERRY, Massachusetts
JOHN B. BREAUX, Louisiana
BROCK ADAMS, Washington

JOHN C. DANFORTH, Missouri
BOB PACKWOOD, Oregon
NANCY LANDON KASSEBAUM, Kansas
LARRY PRESSLER, South Dakota
TED STEVENS, Alaska
ROBERT W. KASTEN, JR., Wisconsin
PAUL S. TRIBLE, JR., Virginia
PETE WILSON, California
JOHN MCCAIN, Arizona

RALPH B. EVERETT, *Chief Counsel and Staff Director*
WALTER B. MCCORMICK, JR., *Minority Chief Counsel and Staff Director*

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE

DONALD W. RIEGLE, JR., Michigan, *Chairman*

ALBERT GORE, JR., Tennessee
JOHN D. ROCKEFELLER IV, West Virginia
LLOYD BENTSEN, Texas
JOHN F. KERRY, Massachusetts
BROCK ADAMS, Washington

LARRY PRESSLER, South Dakota
NANCY LANDON KASSEBAUM, Kansas
PAUL S. TRIBLE, JR., Virginia
PETE WILSON, California

CONTENTS

	Page
Opening statement by Senator Riegle	1
Opening statement by the Chairman	3
Opening statement by Senator Danforth	33
Opening statement by Senator Pressler	44

LIST OF WITNESSES

Berry, Robert E., vice president, space systems division, Ford Aerospace Corp	55
Prepared statement	57
Chamberlain, Roger, vice president, Martin Marietta Commercial Titans, Inc	45
Frankle, Edward A., Deputy General Counsel, NASA	24
Questions of Senator Riegle and the answers	28
Kadar, Eugene, president, Conatec, Inc	50
Prepared statement	52
Kenny, Donald G., vice president, Alexander & Alexander, Inc	58
Prepared statement	61
Moorman, Maj. Gen. Thomas S., Jr., Director, Space Division, U.S. Air Force; accompanied by Janice Bellucci, Office of General Counsel	5
Prepared statement	9
Questions of Senator Riegle and the answers	12
Stadd, Courtney A., Director, Office of Commercial Space Transportation, DOT	16
Prepared statement	18
Questions of Senator Riegle and the answers	21
Yardley, John F., president, McDonnell Douglas Astronautics	47
Prepared statement	48

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

Barrett, James W., president, International Technology Underwriters, statement	77
Murphy, Eugene F., senior vice president, General Electric Co., statement	78

COMMERCIAL EXPENDABLE LAUNCH VEHICLE LIABILITY

TUESDAY, MAY 17, 1988

U.S. SENATE,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The subcommittee met at 9:30 a.m. in room SR-253, RSOB, Hon. Donald W. Riegle, Jr., [chairman of the subcommittee] presiding.

Staff members assigned to this hearing: Marty Kress and John Graykowski, professional staff members; and Pete Perkins, minority professional staff member.

OPENING STATEMENT BY SENATOR RIEGLE

Senator RIEGLE. The committee will come to order. Let me welcome everyone this morning.

We have a roll call vote under way on the Senate floor, and so colleagues will be coming during the course of the morning as they have the chance to cast their votes. We meet today to discuss an issue which the U.S. expendable launch vehicle industry indicates stands between them and commercial success in the world launch markets.

On the other hand, we have the Reagan Administration that claims that legislation such as tha introduced by Senators Wirth, Bentsen, and Danforth is in their view unnecessary and unwise.

In 1984, by way of historical review, this Administration took the first steps toward relieving NASA of its traditional role as the nation's launch provider in a series of executive orders, legislation codifying those policies, and finally IN a virtual prohibition against commercial payloads on Government vehicles.

A private sector launch industry was created. Prior to these actions, the issue of liability insurance was rarely discussed, though there were a number of events in recent years which raised for the first time the possibility that satellite owners might not be able to fully protect against potential losses during a launch.

But for the most part, NASA provided insurance protection to satellite owners on a shared risk basis, and this system functioned effectively for several decades. We have had a remarkable record in this area during this time period. Not one dollar of losses has been paid on a third party claim, despite hundreds of launches.

Despite this record, the world insurance markets may be inadequate to provide coverage for all the risks involved in the commercial launch process. The U.S. satellite industry, ELV manufacturers, anD launch insurers were asked in the span of a very few years and with little notice to become a viable and functioning industry.

The policy announcements have been made. Licenses have been granted. Contracts have been signed. And yet, we find ourselves today, one year from a number of commercial launches, faced with tremendous uncertainty over the cost and availability of insurance for commercial launch providers, an issue that would seem to be basic to any discussion of successful broad-scale commercial activity.

All the while, foreign launch competition continues to grow. Ariane is launching again. They were a formidable competitor in the past for the United States, and they appear in a position to remain so in the future.

The Chinese are aggressively marketing a rocket that has not been developed yet, and customers, both U.S. and foreign, are expressing interest. And the Soviet Union, with its dependable Proton, has been attempting to sell launch services to western nations at very competitive prices, and this wlll continue.

The Japanese have invested millions in the development of a commercial launch system, and they too are serious on capturing the world market.

So the United States faces a critical choice at this time, the choice, which means either we have an active, diverse, and successful private launch industry or we increasingly rely upon foreign nations to meet that need. The stakes are high and the risks are great.

Not only does a domestic ELV industry provide thousands of high technology jobs around the nation and economic benefits to many states, but each U.S. launch of a foreign satellite provides millions of dollars to ease the trade imbalance.

Conversely, each U.S. satellite that is launched on Ariane or other foreign system does further damage to our trade picture.

More importantly, however, the domestic launch industry contributes to our ability to maintain a diverse space transportation system, which is a factor that is critical to the vitality of the broad space program.

We hear today from two panels, the first being Government representatives from the Air Force, NASA, and the Department of Transportation. NASA of course has past experience launching commercial payloads and assessing insurance requirements. The Air Force is placing its assets at risk, and the Department of Transportation licenses commercial launch companies.

The second panel will be comprised of two of the three large ELV manufacturers and one small ELV company which has just received a license to launch sub-orbital research payloads.

Also appearing are Ford Aerospace, one of the largest satellite manufacturers in this country, and a representative of a major insurance broker which handles launch insurance.

Our colleague Senator Wirth, who has introduced legislation in this area with Senators Bentsen and Danforth, is also expected to join us this morning.

The obstacles to success for domestic launch companies are more numerous than just the insurance issue. Certainly, other competitors receive more direct assistance from sponsoring Governments and dedicated launch facilities. But the insurance problem may be something that we can address in the near term to provide some measure of assistance to an industry, to ensure that they can become established and survive over the longer term.

Before we can do that, however, we must be certain that: one, the measure sought by industry is absolutely necessary; two, the risks are allocated between Government and industry in an equitable fashion; and three, the legislative proposals are crafted in as narrow a fashion as possible to provide the greatest level of protection to the U.S. Treasury and taxpayers.

I think our hearings and testimony today will enable us to have the foundation upon which to make those policy decisions.

I have an opening statement that the Chairman, Senator Hollings would like to have included in the record.

[The statement follows:]

OPENING STATEMENT BY THE CHAIRMAN

Good morning. Today the Subcommittee will receive testimony concerning the commercial expendable launch vehicle industry, and the extent to which unique liability problems exist for this developing U.S. industry.

This issue has received a fair bit of attention here in the Congress in the last few months. The, House Science, Space and Technology Committee has reported a bill that will impose limits on the total liability launch companies will face in their operations. This legislation, H.R. 4399, may be taken up soon by the House of Representatives.

In the Senate, Senator Wirth has been joined by Senator Bentsen and Senator Danforth in introducing companion legislation to the House bill. I look forward to the testimony and discussion on this bill this morning.

I must state at the outset, however, that I have many times expressed reservations about the wisdom of the commercialization policies of this administration. I believe very strongly that there are certain functions in the Government that simply cannot be commercialized, and that when you do commercialize, it must be based on a sound assessment of the facts—not ideological rhetoric. After many false starts, today we do have a nascent ELV industry that is actively seeking contracts from private customers and scheduling launches. It took the Challenger disaster, Ariane failure, and a DOD commitment to a base of production to get us here—and the journey still isn't over.

Today, there are both very large companies and small start-up firms that have begun commercial launch operations in response to the Reagan administration's commercialization initiative. And some of these companies will testify that legislation providing indemnification is necessary for the long-term survival of a domestic expendable launch vehicle industry. The builders of communications satellites will tell us that worldwide competition is severe, that the cost differentials between U.S. launch systems, which they prefer, and foreign systems, which are subsidized, already make it difficult to bid a U.S. system, and that the insurance costs in the United States, as well as the potential liability, make it less likely over the long run that they—the builders—will continue to utilize domestic systems.

I am very concerned about foreign competition in this area, but am not sure that the legislative proposals before us today are the right way to meet that competition. One basic problem that we face is putting commercial companies in the United States against Government owned or subsidized foreign organizations such as the French

Ariane, the Russian Proton, the Chinese Long March or the Japanese H-2. I just don't see how we can win in the long run when the competition is this unequal.

So I will listen very closely to this testimony, both from the Government witnesses, who don't support the bill, and from the industry. I think that we do need a launch industry in this country—it's good for NASA, good for the country to have many different launch systems in operation. But we must all be able to make the case that a commercial ELV industry is truly in the national interest over the long run, that the legislation that has been introduced is necessary to promote this industry, and that the legislation is a commitment that we, as a nation, should make to this one industry.

Despite industry's strong endorsement of an indemnification bill, the Administration witnesses—the authors of the commercialization policy for ELVs—will tell us that indemnification is not required. Needless to say, that leaves us with a very interesting debate.

Should we endorse this legislative initiative because it will make the U.S. expendable launch vehicle industry more competitive? Are we to enact it because it will minimize the risks of the respective firms? And if legislation is appropriate in this area, why shouldn't indemnification be provided for other U.S. industries where the risks exceed the net worth of the company, a not all too unfamiliar situation for many U.S. industries.

If the Congress does not pass this legislation, what would happen to the U.S. industry? Would a U.S. expendable launch vehicle industry disappear, or would an industry willing to take greater risks, and therefore greater care, in providing launch services emerge?

Finally, I can't help but wonder from time to time, if we are not debating the wrong issue. Perhaps we should be asking ourselves whether or not the U.S. should be trying to promote a commercial expendable launch vehicle industry when the rest of the world is promoting Government-subsidized launch vehicle industries—the French Ariane, Russian Proton, Chinese Long March, and Japanese H-2 launch vehicle systems. Maybe the best thing to do is not pass an indemnification bill, but create a Arianesnas USA—a Government launch agency that competes with the foreign competition on an equal footing with the full faith and credit of the U.S. Government at their disposal.

I realize that there are many persons who argue that the Congress is not supportive of the commercialization of space—unfortunately these same people have not lived through the agony of dealing with the Administration's proposals for commercializing land remote sensing. Despite the appeal of the Walt Disney school of public policy, wishing will not make it so.

If the Congress enacts any additional legislation concerning space commercialization, it will be because there is a clear and compelling case for commercialization and for such legislation—not because the industry wants it or the Administration wants it.

To help the Committee with its deliberations over the insurance issue, the Committee has asked the Congressional Research Service of the Library of Congress to update its' 1985 report on "Insurance and the Commercialization of Space." Work on that report is progressing well and the Committee hopes to have this update in the very near future—perhaps at the end of May or in early June. For those who have not read the previous report, I would recommend it. I would also like the hearing record to note that this Committee has been trying to tell this Administration that insurance issues have been critical to space commercialization since 1985—unfortunately, there was little interest in this element of the space commercialization program.

Mr. Chairman, there are a lot of issues that need to be explored today and I will listen very closely to this testimony. However, I want everybody to realize that I have serious reservations with this proposal and the onus is upon the witnesses to convince me of the merits of, and need for, this legislation for this industry.

Senator RIEGLE. With that, let me introduce our first panel. We have with us this morning Major General Thomas Moorman. We have Mr. Courtney Stadd, who is the Director of the Office of Commercial Space Transportation at the Department of Transportation; and Mr. Edward Frankle, here representing NASA.

So in that order, I would call on you now to give a summary of your testimony, and we will make the full testimony a part of the record. And Major General, we would be pleased to hear from you first.

STATEMENT OF MAJ. GEN. THOMAS S. MOORMAN, JR., DIRECTOR, SPACE DIVISION, U.S. AIR FORCE, THE PENTAGON; ACCOMPANIED BY JANICE BELLUCCI, OFFICE OF GENERAL COUNSEL

General MOORMAN. Thank you and good morning, Mr. Chairman.

I appreciate the opportunity to represent Secretary Aldridge this morning to discuss the Air Force support of the commercial space launch industry and to provide our views on the bill before us, H.R. 4399.

I am accompanied today by Janice Bellucci from the Air Force's general counsel's office, who will assist me in answering questions.

Mr. Chairman, I have a statement that I will submit for the record, and I would like to highlight the pertinent points of that statement at this time. I think if you look back over the last two years, you can clearly see that a lot of progress has been made in the commercial space launch industry and that the emergence of this new industrial sector is indeed a reality.

The Air Force has been in the forefront of this development. It is due mainly to the fact that we are deeply involved in all phases of space launch infrastructure and we manage much of it: the production lines, the launch facilities, and the test ranges.

We welcomed this involvement, not only in that it complies with the Commercial Space Act and it furthers the President's policies, but that we believe completely that a strong and robust national space launch capability is good for the country. There is a natural synergy between national security and the commercial launch programs, and this cooperation is to the benefit of both programs.

I think a brief history of the Air Force's involvement in support of the Commercial Space Launch Act will allow us to better frame the issues that are before this committee today. As you know and AS you mentioned in your remarks, Mr. Chairman, the Commercial Space Act was enacted in 1984, and that was in an era where the policy of the country was to go to single reliance on the space shuttle for our access to space.

Thus, the Government was ending our expendable launch vehicle programs. With the anticipated end of these expendable launch vehicle programs, it looked as though, to the commercial space industry, that there would be surplus launch property, launch services, and launch sites. This picture, of course, as everyone knows, dramatically changed in 1986, primarily due to the tragic loss of the shuttle.

Now, instead of reliance on a single system, the country now has gone to a mixed fleet of vehicles for our access to space. The Air Force ELV programs have been revitalized and those resources that two years earlier were thought to be in surplus now have become in short supply.

About this same time, the commercial space industry—some of the industry who had satellites that had been booked on the shuttle—were seeking an avenue TO space, and several commercial expendable launch vehicle companies wanted to provide that avenue if the Air Force could make available launch sites and launch services.

The Air Force worked quickly to identify resources that could be made available to commercial expendable launch vehicles and, as you know, came up with, in coordination with the Department of Transportation and in consultation with the industry, a model launch services agreement which would be a legal contract to accommodate the companies' needs.

This model agreement defined the terms under which the Air Force would provide support in such areas as launch pad use, propellants and range services. These would be available under cost reimbursable terms.

I think it is interesting to note that at the present time there are four signed agreements, with Martin Marietta, with McDonnell-Douglas, with General Dynamics, and with E Prime, allocating a total of 119 launch opportunities between now and the end of 1995.

Of the 46 opportunities that are available in 1988 and '89, there are agreed and signed contracts for ten of those launches.

The initial model agreement stipulated the maximum protection for the Air Force in accordance with our interpretation of the law at that time. For example, it required commercial expendable launch vehicles to protect the Air Foce against any loss or damage of Government property, regardless of fault.

This had quite a reaction on the part of the commercial space launch industry, and they came back and said they could not operate in a viable manner under those provisions. Thus, following an intense policy and legal review, the Air Force modified the model agreement and the agreement to require protection, and a much more relaxed fault standard, only up until the amount of insurance that could be obtained at a reasonable cost. Any loss or damage above that amount would be determined according to the fault.

The Air Force anticipates modifying this agreement again to reflect the Administration's policy on insurance and to comply with the amendments that may come out of these deliberations.

Let me now turn to some of the recent accomplishments in our support to the commercial space launch industry. As part of our production support to the industry, the Defense Department will provide high reliability piece parts, such as resistors and transistors, currently built and available. Now, some launch companies in addition have requested in-plant Government quality control services to achieve the same level of reliability that we currently have with Government booster programs.

We agreed to this service on a cost reimbursement basis to existing production lines that already have Government contracts, and Martin Marietta and McDonnell-Douglas have joined up in this. The advantage of this is it will achieve a common quality control standard at the subcomponent level.

This action also gives the commercial customer the assurance of highly reliable piece parts, thus a highly reliable launch vehicle, and allows parts interchangeability, which again will benefit both sectors.

In another and to expedite the availability of domestic launch services——

Senator RIEGLE. I am going to ask you, if I can, to try to summarize in another minute or so, because I want to make sure that we are going to have sufficient time to go ahead on through. And so if there are key points——

General MOORMAN. If that is the case, then, sir, let me turn to our comments on the actual bill, because that is what I really wanted to speak to.

There are two areas, sir, that concern us on H.R. 4399. The first, I want to comment and say that H.R. 4399 is a marked improvement over the initial H.R. 3765, in that we believe it gives a much more balanced approach in balancing the needs to stimulate a commercial space launch industry without jeopardizing national security.

But there are two concerns. The first of those is with section 5(b), and this would require that the Air Force to provide to those satellites which have been bumped from the shuttle free launch property and free launch services. This in effect would direct the Defense Department to expend funds that have not been authorized or appropriated in the defense budget.

Now, what does this mean in terms of dollars and cents? The direct costs that we are talking about in terms of launch services, which in this case are things such as test range use, launch property, as propellants, we are talking about approximately $15 million at a minimum.

Now, that is $15 million of the taxpayers' money, and I need to emphasize that, of the 14 satellites under consideration, half of which are foreign satellites.

The other one involves an interpretation question, whether or not launch property is interpreted as meaning the launch vehicle booster itself. And I do note that the Senate bill says that that interpetation is not correct. The bottom line of this is that the Defense Department believes that the provision of commercial launch services from the Government would be inconsistent with the President's policy not to directly subsidize the industry.

The second concern is section 4(a), which limits the amount of insurance that the Department of Transportation can require from the commercial space launch industry to protect U.S. Government property. As currently written, section 4(a) states that commercial space companies are to obtain no more than $100 million or the maximum insurance available on the world market at a reasonable cost, whichever is less.

The effect of that phrase, "whichever is less," is that Government property will not be insured greater than $100 million even if the property at risk has a value in excess of that amount, and even if the insurance is available at a reasonable cost.

The issue here, of course, is that the property that we are talking about being at risk is absolutely crucial to the national security. That is, launch pads and infrastructure that we use to launch some of the highest priority national security satellites.

Now, one of the things I should mention to you, and that is in my statement, is we have just finished a very comprehensive technical assessment of what are reasonable risks by several different kinds of commercial launches from different launch pads.

From this data, we have adopted a policy of maximum probable loss standard. That is, what is the most likely scenarios and how much dollar value might that entail?

As we went through this assessment we decided not to include in that amount the risks to adjacent launch pads, wherein you would have a booster erected with a satellite on top of the booster.

Thus when a commercial launch is getting ready to take place, we will through operational procedures, assure that that adjacent pad is not occupied. Now, if you look at this criteria, the greatest risk for Titan boosters, which is the largest of the commercial boosters that we are talking about, is assessed to be in the vicinity of $300 million.

It is less, of course, for smaller class boosters, the Deltas and the Atlas, for example. Now, given this level of exposure, the Defense Department feels that it is prudent to protect the taxpayers' investment to the fullest extent by trying to get the maximum amount of insurance at reasonable cost.

Therefore, we recommend that the term "whichever is less' be deleted from the proposed section. Maximum insurance then would be determined in response to changing factors by the Secretary of Transportation and reset during the annual review process if required.

The last point with respect to 4399 is that it removes the consultative process with the Attorney General and with other interested agencies, such as the Defense Department. We believe that the existing law and that consultative process has served us well, has had a positive effect, and has assured that all the risks and all the discussion gets aired during such deliberations.

In concluding, Mr. Chairman, the Defense Department and the Air Force specifically strongly supports the commercial space launch industry, and I hope that my remarks have underscored this fact. I appreciate the opportunity to appear before you and will now entertain any questions that you might have.

Thank you.

[The statement and questions and answers follow:]

STATEMENT OF THOMAS S. MOORMAN, JR., DIRECTOR OF SPACE AND SDI PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE—ACQUISITION

Mr. Chairman and members of the committee: Thank you for the opportunity to discuss the Air Force's support of this Nation's commercial space launch industry and H.R. 4399,[1] the proposed Commercial Space Launch Act Amendments of 1988.

As any process learns from experience and fine tunes itself as time goes on, the commercial space launch area is no exception. Progress over the last 2 years has been quite significant, and the emergence of a new commercial space launch industrial sector is a reality.

The Air Force has been in the forefront of commercial launch development, due mainly to the fact that we manage or are involved in a major portion of the nation's space launch-related infrastructure—the production lines, launch facilities and test ranges. We welcomed this task, not only because it complies with the Commercial Space Launch Act and furthers the President's policies, but because a robust national space launch capability and the synergistic effects of combined national security and commercial launch programs benefit both sectors.

A brief history of the Air Force's efforts in support of the Commercial Space Launch Act will better frame the issues before us today.

As you know, the Commercial Space Launch Act was enacted in 1984. At that time, the U.S. Government planned to reply on the shuttle for its access to space. Thus, the Government was ending its expendable launch vehicle [ELV] programs. The anticipated end of Government E-L-V programs meant there would be available to commercial launch companies surplus launch sites, launch property, and launch services.

The events of 1986—which included the loss of the *Challenger*—significantly altered the Nation's plans. Instead of reliance upon a single system, the United States realized the necessity of a mixed fleet for its assured access to space. Air Force E-L-V programs were revitalized and some resources, thought to be in surplus, became in short supply.

At about the same time, commercial satellites—some originally scheduled to be flown on the shuttle—were seeking an avenue to space * * * several E-L-V companies wished to provide that avenue * * * if they could use Air Force launch sites, launch property, and launch services.

The Air Force worked quickly to identify resources that could be made available to commercial E-L-V companies on a direct cost basis. In coordination with the Department of Transportation and after soliciting comments by industry, we produced a model launch services agreement, a legal contract, to accommodate those companies' needs.

The model agreement defines the terms for Air Force provided support, such as launch pad use, propellants and range services, available under cost-reimbursable terms. At the present time there are four signed agreements allocating a total of 119 commercial launch opportunities from now to 1995. Of the 46 possible launch slots we have agreed to support in 1988 and 1989, industry already has firm contracts for 10 launches.

In addition to support for existing launch vehicle designs, the Air Force Astronautics Lab provided rocket engine test facilities for development use by the American Rocket Co., even though a commercial launch agreement is not finalized with AMROC.

The initial model launch agreement stipulated maximum protection for the Air Force in accordance with out interpretation of the law. For example, it required commercial E-L-V companies to protect the Air Force from all loss of, or damage to, Government property regardless of fault.

After commercial E-L-V companies stated they could not viably operate under the conditions stated in the initial agreement, and following intense legal and policy reviews, the Air Force significantly modified that agreement to require protection, with a more relaxed fault standard, only up to the amount of insurance available at a reasonable cost. Any loss of, or damage to, Government property above that amount is to be determined according to fault.

The Air Force anticipates revising that agreement again to reflect the administration's policy on insurance and to comply with any amendments to the Commercial Space Launch Act.

Let me now review some of the recent accomplishments in our support to the commercial launch industry:

---

[1] References to H.R. 4399 also apply to S-2395, which was introduced on May 13, 1988 by Senators Wirth, Benson and Danforth.

As part of production support for the industry, the Defense Department will provide some high reliability piece parts such as resistors and transistors, currently built and available. Some launch companies requested in-plant Government quality control services to achieve the same level of reliability standards as Government boosters. We agreed to provide this service on a cost reimbursement basis to existing production lines that have active Air Force contracts. This will achieve a common quality standard at the subcomponent level. This action gives a commercial customer the reassurance of a highly reliable launch vehicle and also allows parts interchangeability to the benefit of both programs.

To expedite the availability of domestic commercial launch services, we provided two Air Force-owned Thor rocket engines to the Commercial Delta Program in exchange for contract consideration on the Delta II Program. In satisfying McDonnell Douglas' request for these engines, the Commercial Delta Program was accelerated to capture launch contracts for two commercial launches in 1989.

Our test centers, especially the Eastern Space and Missile Center, have been involved in all aspects of commercial launch support. Initial requirements processing is complete for four (4) companies and detailed planning to support commercial launch activities is underway.

The Eastern Space and Missile Center Range Safety Office recently completed a first-of-a-kind technical analysis describing Government resources place at risk by various types of commercial launches from different launch sites of Cape Canaveral. This data is being used in the ongoing determination of adequate insurance coverage for Government resources.

Finally, Air Force space launch programs have included provisions to facilitate the development of the commercial launch industry. In 1987 we awarded a competitively selected contract for the Delta II launch vehicle. The Delta II incorporates provisions which depart from the normal Government practices to simplify procurement and at the same time facilitate commercial sales. Procurement of launch services instead of actual hardware is one key consideration.

We just completed another competition for the medium launch vehicle II, and selected the Atlas II design for this task. The Atlas II went one step farther than Delta II—its streamlined proposal process more reflected that system used in the commercial sector, included provisions for launch services, and uses contractor-managed but Government-approved controls to reduce the level of Government technical involvement without loss of reliability. Atlas II will use pre-negotiated costs for additional launches instead of requiring lengthy contract change negotiations. These and other aspects of the Atlas II Program move the procurement process for this booster more toward a commercially offered launch capability.

From this review, it is apparent that the Air Force is involved on a daily basis with the commercial launch companies, and we are working very hard to bring this new industry to full maturity. With this framework of continuous interaction and experience in mind, I would like to comment upon H.R. 4399, the Commercial Space Launch Act Amendments of 1988, and its impacts from our viewpoint.

First, the amendments are a marked improvement over H.R. 3765, the Commercial Space Launch Act amendments initially introduced by the House. H.R. 4399 reflects a more balanced approach to the complex issue of supporting the commercial space industry while not adversely affecting the National's defence.

The Air Force has two primary concerns with H.R. 4399. The first concern is that Section 5(b), which would require the Air Force to provide satellites "Bumped" from the shuttle with free launch property and launch services, would direct DOD expenditures for which funds have not been authorized or appropriated in the defense budget.

The Direct cost to the Air Force for free launch property, such as propellants, and free launch services, like test range use, is estimated at a minimum of $15 million. That's $15 million of taxpayers dollars being spent on commercial satellites, half of which are foreign owned. The total cost to the Air Force for providing property and services also depends upon whether "launch property" include launch vehicles. The definition in the Commercial Space Launch Act appears to include the launch vehicle hardware. The Air Force recommends that the owners of these 14 satellites purchase launch services from the private sector. The provision of commercial launch services from the Government would be inconsistent with the President's policy regarding direct Federal Subsidies.

The Air Force's second concern is with section 4(a) which limits the amount of insurance the Department of Transportation can require from commercial space companies to protect U.S. Government property. As currently written, section 4(a) states that commercial space companies are to obtain no more than $100 million or "the maximum insurance available on the world market at a reasonable cost,

whichever is less." The effect of the phrase "whichever is less" is that Government property will not be protected by insurance in amount than $100 million. Even if the property at risk is valued in excess of $100 million and the issuance is available at a reasonable cost.

This issue is an Air Force concern because the Government property that will be at risk will be resources on Air Force test ranges that we need to fulfill our primary mission—the security of the United States. As I mentioned earlier, we recently completed an analysis which examined the risks associated with different commercial launches. For purposes of computing insurance coverage recommendations to the Department of Transportation, the Air Force has adopted a maximum probable loss standard. Further, we have made a policy decision to not require insurance coverage for collateral damage to DOD spacecraft. Instead, we will protect them through instituting launch and launch preparation procedures which insure that high value Government satellites are not in near proximity to a commercial space launch event.

Using these criteria, the greatest risk, for Titan boosters is assessed to be in the vicinity of $300 million. It is less for smaller launch vehicles. Given this level of exposure, it seems prudent to protect taxpayer investment to the fullest extent feasible at reasonable cost.

We recommend that the phrase "whichever is less" be deleted from the proposed section. Maximum available insurance values could then be determined in response to changing factors by the Secretary of Transportation and reset during the annual review process, if necessary.

I would also like to point out that H.R. 4399 removes the consultation requirement on insurance levels with the Attorney General and other appropriate agencies such as the Defense Department. We believe that the existing law and the consultative procedures already established are working in a positive manner to assure all views are represented during such deliberations.

In concluding Mr. Chairman, let me say that I believe the Air Force is continuing the encourage and foster the growth of the U.S. commercial space launch industry and my comments today reflect that view. I appreciate the opportunity to address you today and will answer any questions you may have on this subject.

QUESTIONS OF SENATOR RIEGLE AND THE ANSWERS

REPAIRS AT VANDENBERG AFB

Question: How do you envision that the insurance system suggested in S. 2395 will actually work if this bill is enacted?

Answer: Unless this bill is enacted into law with a provision that authorizes the Air Force to credit current applicable appropriation with insurance proceeds, such insurance proceeds will have to be paid into the miscellaneous receipts account and that could not be reused by the Air Force.

Question: Do you anticipate delays associated with receiving funds in the event of an accident?

Answer: Yes, the Air Force anticipates delays associated with receiving insurance proceeds in the event of an accident. Delays are expected to be based upon anticipated litigation to determine the cause of the accident, including whether the damage was the result of the reckless disregard or willful misconduct of the United States or its agents, as well as possible disputes regarding the value of the property that was damaged or destroyed.

Question: How long did it take to repair the launch facility at Vandenberg Air Force Base after the April 1986 Titan 34-D accident? Can you tell us how extensive the damage was, were any personnel injured and what was the final cost of the repair?

Answer: The two damaged launch sites were Space Launch Complex 4 East (Titan 34D) and Space launch Complex 4 West (Titan 34B now converted to Titan II). The repair time was seven and six months respectively.

The damage was fairly extensive to both pads but was not as extensive as it could have been. The vehicle exploded 700 ft above the launch pad and no large solid rocket motor segments, payloads, or core booster sections impacted on the major launch pad structures. The damage sustained was due to fragmentation and fires resulting from secondary explosions caused by Solid Rocket Motor segment ground impacts. Damage sustained at the facility involved damage to the Technical Support Building, Fuel Transfer Facility, East and West pad Umbilical Towers, pad weather towers, and East and West Pad Electrical Systems. Two Support Trailers, the East Pad Nitrogen and Helium Supply Systems, and the East Pad Vehicle Air Conditioning Facility were destoyed and required total replacement.

No personnel were injured as a result of the accident. The concrete block house where the launch crew was located, 1200 ft from the launch pad, sustained no major damage.

The cost to repair both pads was $58.1 million.

Question: Is there any reason to think that a commercial Titan III mishap would cause more damage to your launch facilities, or was this the worst possible incident, as near as vou can tell?

Answer: A commercial Titan III mishap could be much more damaging than the Titan 34D failure of April 1986. The Titan 34D failure that damaged Space Launch Complex 4 West and Space Launch Complex 4 East at Vandenberg AFB was as massive an explosive detonation as could be expected during a Titan 34D launch. The resulting pad damage, however, was not nearly as extensive as it could have been. The vehicle exploded 700 ft above the launch pad with large solid rocket motor segments, payload, and core booster sections impacting among the major launch pad structures. Luckily no major structures were hit by the debris and most of the resulting damage was due to fragmentation and fire resulting from secondary explosions caused by solid rocket motor segment ground impacts in the launch pad area. If any of the large debris had directly impacted a Mobile Service Tower, Umbilical Tower, or Launch Service Building, the pad damage would have been enormous. As it was, the repairs required seven months for the East pad and six months for the West pad for a total of $58.1 million. Potential exists for much greater damage with much longer, and more costly recovery actions.

LAUNCH SERVICES

Question: NASA will be purchasing launch services, and the Air Force has also been encouraged to do the same. As a matter of fact, NASA just completed negotiations on behalf of NOAA for launch services for the GOES weather satellites. What is the current Air Force position with respect to insurance or indemnification in the purchase of launch services?

Answer: The Air Force requires commercial space launch companies using Air Force ranges or performing activities on other Air Force property to obtain insurance to protect government and Air Force ranges. The Air Force policy with regard to launching government payloads is to address indemnification on a program-by-program basis. The Air Force has no legal authority to indemnify the launches of non-government payloads. Therefore, it is our policy that decisions regarding the indemnification of the launches of non-government payloads are the responsibility of other government agencies (e.g., the Department of Transportation).

Question: Will Section 308 or 504 authority be extended for government payloads?

Answer: The Air Force has recently indemnified McDonnell Douglas and General Dynamics for all risks resulting from or in connection with (1) the burning, explosion and or detonation of launch vehicles or components thereof during liftoff or flight and (2) the landfall of launch vehicles or components or fragments thereof in connection with the launch of government satellites aboard Delta II and Atlas II launch vehicles. In its recent indemnification of McDonnell Douglas and General Dynamics, the Air Force utilized its authority under Public Law 85-804. Section 308 refers to statutory authority available only to the National Aeronautics and Space Administration under the National Aeronautics and Space Act.

Question: If not, will the price paid by the government have to be higher to reflect insurance costs? If so, how much higher? Conversely, will the price paid by the government be lower if indemnification is extended, and would this indemnification be both first and third party?

Answer: The Air Force will pay both McDonnell Douglas and General Dynamics $600,000 less for each launch of a government satellite because of indemnification. Indemnification will extend to possible damages sustained by both first and third parties.

Question: If indemnification is going to be extended in these circumstances, why there but not for commercial launches?

Answer: A government agency requires statutory authority in order to indemnify. The Air Force has only two sources of such authority, Public Law 85-804 and 10 U.S.C. 2354. The activities of commercial launch companies engaged in the launch of private sector satellites do not fall within the purview of either statutory provision.

COMMERCIAL SPACE LAUNCH AMENDMENTS

Question: On May 20, 1988, just prior to floor consideration of H.R. 4399, the House companion to S. 2395 -- the Commercial Space Launch Amendments — the Administration issued a policy statement that indicated the President's Senior advisors would recommend the President veto the bill. The message went on to say that the bill in its present form provided excessive and unnecessary federal subsidies to the private launch industry. What role, if any, did your office play in the formulation of this veto message?

Answer: The Air Force advised the Administration of its concerns regarding S. 2395, which have also been stated in testimony to Congress. Questions regarding the recommendation of a veto are better answered by the Office of Management and Budget.

Question: What information or data does the Administration have to support their position that this legislation represents "excessive" and "unnecessary" federal subsidies?

Answer: This question can be better answered by the Department of Transportation and the Office of Management and Budget.

Question: What is the Administration's estimate of the total cost associated with waiving the direct cost associated with the use of government ranges for commercial payloads that were bumped from the space shuttle?

Answer: Assuming the government is not required to provide those commercial payloads with no-cost launch vehicles, the Air Force estimates that waiving the direct costs associated with the provision of launch property and launch services for the 14 "eligible" satellites would cost approximately $15 million.

Question: Is the real issue with this objection the fact this is a "substantial" subsidy or that the Air Force would be required to absorb this expense?

Answer: The Air Force objects to the use of Air Force funds to support commercial space objectives.

Question: Is it not the Administration's intention to waive all first party claims above reasonable insurance levels -- even if the total damages exceed the value of that insurance? Why doesn't this action constitute a direct subsidy?

Answer: The President announced on February 11, 1988, that the Administration would administratively limit the liability of commercial launch operators for damage to Government property resulting from a commercial launch accident to the amount of insurance required by the Department of Transportation.

Question: Does the Ariane launch system directly subsidize the insurance costs associated with the launch of their ELV?

Answer: The Air Force has participated in U.S. Trade Representative discussions with the European Space Agency and Arianespace as a technical advisor. As stated, the Air Force's role is limited to technical issues and, therefore, the U.S. Trade Representative or Department of Transportation is a better source for an answer to this question.

Question: What about the Long March system?

Answer: The Air Force has no knowledge regarding insurance arrangements between the Chinese and its ELV customers, if any.

Question: Does the Administration have any evidence that U.S. commercial ELV firms can compete with foreign systems without any direct subsidies?

Answer: The Air Force cannot answer this question. The Department of Transportation is a better source for an answer to this question.

Question: What type of "indirect" subsidies is the Administration willing to provide?

Answer: The Air Force cannot answer this question. It should be referred to the Department of Transportation.

Question: Is the Administration's objection to the reciprocal waivers requirement the result of the standard used in H.R. 4399? For example, would this objection still exist if there was an exclusion for situations where there was no "governmental negligence?"

Answer: Questions regarding overall administration views should be addressed to the Department of Transportation. The Air Force is concerned that reciprocal waivers provide a substantial risk reduction measure for the commercial space launch industry at the expense to the government of the assumption of a greater risk than is warranted. The Air Force recognizes that cross-waivers were utilized by NASA in launches of the Space Shuttle, but believes the reasons for doing so in that environment are not existent when launching commercial expendable launch vehicles. The Air Force shares the concerns expressed by NASA in testimony to the committee that the reciprocal waivers of revised Section 16(a)(1)(D) are too broad and would include, for example, breaches of contract.

Question: What evidence does the Administration have that the reciprocal waiver provision would interfere with the "ability of the ELV industry to enter into commercial space launch contracts?"

Answer: The Air Force has no information on this issue.

Question: Does the Administration's objection to indemnification stem from an objection to the concept or to the fact that industry has failed to establish the justification for this type of protection?

Answer: The Air Force cannot speak for the Administration on this issue. DoD has not received any documentation with respect to justification. The Department of Transportation is the lead agency for commercial space launch. Questions regarding overall administration views should be addressed to them.

Senator RIEGLE. Thank you.

Mr. Stadd, I am going to ask you, if you would, to direct your comments right at the legislation, issues that bear on the legislation. Other remarks that you would make to us on the '89 authorization and other things along that line, we will put in the record.

But I want to stay right on the insurance issue. So we would be pleased to hear from you now.

STATEMENT OF COURTNEY A. STADD, DIRECTOR, OFFICE OF COMMERCIAL SPACE TRANSPORTATION, DEPARTMENT OF TRANSPORTATION

Mr. STADD. Mr. Chairman, in that regard I would only bring to your attention, and I will spend five seconds on it, that I understand that our request is in some jeopardy vis a vis the appropriations committee meeting next week, and that what I heard this morning is very disconcerting.

I understand they may be cutting us even more than last year. And during these proceedings you will be asking us questions about risk assessment and industry capability, a number of things that are very much a function of our funding level. And to the extent to which I have difficulty answering your questions, it may reflect in part the funding cut we had last year.

So that is the end of my editorial. But I appreciate the effort of the Senators last year to help us. We really need your help this year because, as you reflected in your comments, we are staring now at a very active industry. We have 14 contracts, and I include the contracts signed with the Government as well as the commercial foreign contracts that are worth $770 million.

My Department has now licensed one. We have gone through four mission reviews and we expect as many as ten by the end of the year. That is where we stand.

In terms of the legislation, Mr. Chairman, I just would like to make one comment and then defer to questions, because I know you want to spend the core of this meeting, of course, on the discussion.

There are no easy answers. This is an extremely complex area. This is a very dynamic area. When we last came before this committee a year ago, there was little attention paid to the question of insurance. I think we spent most of our time at the last hearing discussing the Air Force model agreement.

Six months ago, insurance reared its head, specifically the issue of third party liability. We have been attempting to grapple with that. The first party, the property area, turned out to be a contentious issue and, as the General said, we have been working that in a manner that I think is consistent with the language in the proposed legislation.

I think both the negligence standard and the other property provisions are very much consistent with where the Administration has come out on this issue.

I would join with the General in most of his concerns and would say that probably the most contentious part of the legislation is the indemnification issue. As the committee knows, indemnification has been a very controversial matter in this Congress, in previous Administrations, Democratic and Republican, for years.

We have seen the lack of indemnification in the general aviation industry, so say the aircraft manufacturers, drive them abroad. Yet the Government has not provided indemnification.

That is an equally controversial issue in the pharmaceutical industry, and I believe that we are beginning to see some concerns surrounding the AIDS vaccines. There is some call for indemnification there.

The question that I have had to confront as I have had to work through that issue in the Administration is whether this industry has quantified its case sufficiently for the Administration to come out and support what would essentially be a precedent-setter.

It is true that the Congress took this indemnification type step within the nuclear industry years ago. But in many respects, this would be new ground and it would be a precedent that other Secretaries would be looking to.

As I indicate in my written statement, I made the case or tried to make the case for some form of provision of indemnification months ago. In fact, before it became, quite frankly, as controversial as it has become.

I confronted basically the arguments that I have laid out. I confronted those who said, why should we be putting an unlimited claim on the judgment fund, especially in light of the remarkable history that this industry has shared?

Let me stop at that point and let me just emphasize that I do not think——

Senator RIEGLE. I thought you were getting to a punch line there. I mean, you were building us right up to it.

Mr. STADD. Well, the punch line was that I walked out empty-handed, basically. The view in the room was that this was not the time to proceed with indemnification. Instead, the decision was to try to address the most contentious part of the third party area, which is the non-economic damages, the view being that jury awards in the punitive damages area tend to be the most difficult for corporations to respond to.

And so we in the Commercial Space Working Group supported a cap of $200,000 per individual in that area, and then left to other mechanisms the determination of appropriate economic damages.

The feeling was that the most difficult part of the insurance equation was property and, as the General laid out, the President agreed to have a formula in which the Department of Transportation would determine the appropriate level of insurance based on a negligence standard. Beyond the level that we set, the Government would absorb the damages.

Again, our feeling was that that went to the heart of the uncertainties that were affecting this industry. That is where we stand today.

[The statement follows:]

STATEMENT OF COURTNEY A. STADD, DIRECTOR, OFFICE OF COMMERCIAL SPACE TRANSPORTATION, DOT

Mr. Chairman, members of the subcommittee, thank you for this opportunity to comment on H.R. 4399, and in the President's budget request of $3.8 million to fund the activities of the Office of Commercial Space Transportation. Both measures are intended to facilitate American commercial launch activities, H.R. 4399 by helping to defray some of the costs assumed by commercial launch companies, and the President.s budget request, by strengthening the Department's ability to craft efficient safety regulations for those companies under the requirements of the 1984 Commercial Space Launch Act.

The transition from a Government-dominated space launch program to the commercial launch industry envisioned by the Commercial Space Launch Act has demanded innovation in policies and practices by both Government and industry. For example, the amount of liability and property damage coverage which launch firms were required to purchase commercially has long been at issue. These firms theoretically would have had to protect themselves against virtually limitless financial losses. Congress, the launch industry, and certainly the Administration, including the Department of Transportation, have worked actively to help an emerging commercial launch industry deal with a highly competitive international marketplace.

On February 11, the President announced that he would propose to Congress a $200,000 cap on noneconomic damage awards to individual third parties resulting from commercial launch accidents. The liability of commercial launch operators for damage to Government property resulting from a commercial launch accident will be administratively limited to the level of insurance required (as part of a license) by DOT. If losses to the Government exceed this level, the Government will waive its right to recover for damages. Companies will not be held liable for damages amounting to less than this amount when such damages are attributable to Government's willful misconduct or reckless disregard.

H.R. 4399 seeks to relieve the launch industry of this level of risk by setting a cap on require? levels of third-party liability and Government property damage insurance. Within these limits, the bill authorizes the Department of Transportation to make insurance determinations for each launch license issued. But H.R. 4399 also requires the federal gov?rnment to indemnify commercial launch operators, their contractors and subcontractors, should their launch activities result in damage to third parties beyond the level of insurance coverage the Department requires.

As this Committee is aware, the subject of indemnification has been a controversial one, debated extensively among the launch industry, the Administration, and in Congressional hearings. Last July, the Commercial Space Working Group of the Economic Policy Council declined to support the industry's request for indemnification. The group concluded that this sort of extraordinary remedy could not be justified for the launch industry. The members also noted the industry's own failure to demonstrate that the absence of such support—Government indemnification—would hamper its ability to compete in the international market against foreign launch systems, all of which are indemnified by their Governments. Furthermore, it is apparent that other industries, such as the aircraft and pharmaceutical industries, have not received preferential treatment in this area.

The President has also authorized the Government to use its authority to waive claims for Government property damage existing that exceeds the levels of insurance required by DOT. However, the flexibility under this policy is removed by the $100 million insurance amount. Above this amount, the U.S. Government is responsible for damages. This could be viewed as a direct federal subsidy if the cap amount is significantly lower than the maximum probable loss.

It goes without saying that the Department of Transportation is supportive of appropriate actions which strengthen the position of America's commercial launch industry in the world market and which help American industry increase market share.

But we believe, and our enabling legislation is also predicated on the belief, that the most effective way to do this is through policy initiatives that will allow the commercial motive to predominate. The President's national space initiatives announced in February, with their strong reliance on the commercial sector to meet national launch needs, will go far toward achieving this goal. Based upon the present level of activity in the launch industry, however—which has required a correspondingly high level of activity at DOT—we have found that one thing is critical to the industry's competitiveness in an international market: That is a licensing agency with the resources needed to make well-reasoned decisions which address applicants, unique concerns while protecting public safety.

To date, our office has received six applications from launch firms. Of these, we have completed three mission reviews and one safety review. We have three additional mission reviews and one safety review now underway. I anticipate 10 more requests for licensing actions before the year ends—a 250 percent increase over 1987.

The mission/safety reviews included the license we issued in January to Conatec, Inc. Conatec is the Lanham, Maryland launch company that has planned a series of launches carrying experimental payloads for a foreign customer. Last week, DOT announced the level of insurance that it will require Conatec to carry to conduct these launches. Based on a comprehensive analysis of the risks and hazards that these commercial launches could pose to public and Government property, we determined that Conatec should obtain $10 million in third-party liability coverage and $7 million coverage for damage to Government property. This insurance determination is the first time that Government has issued a required amount of coverage based upon a thorough analysis of the potential hazards posed by a specific launch event.

The President's comprehensive National Space Policy, a significant portion of which emphasizes greater reliance on commercial services, combined with the willingness and ability of the launch industry to meet the needs of a diverse domestic and foreign clientele, highlights the Department's critical need to augment the present level of staff and technical expertise. The President's budget request is $3.8 million for fiscal year 1989. Since FY 1986, appropriations for the Office of Commercial Space Transportation have averaged less than 50% of the President's requests, usually because people doubted that the commercial industry would really come into being. The events of the last year have removed those doubts, and the date of activity is now unquestionable. If we do not the funding needed to meet those requests, our office will be unable to keep up with industry's short-term growth, let alone encourage the innovation and diversity necessary to ensure its long-term vigor.

The Commercial Space Launch Act authorizes us to license launches by U.S. citizens from foreign as well as domestic sites, to review payloads not under the authority of other agencies, and to license commercial launch sites. In February, the State of Hawaii announced that it had identified two sites, either of which would be appropriate for a commercial spaceport. On March 25, the Governor of Florida also announced plans to establish a commercial spaceport. The State of Queensland in Australia is also looking into building a commercial launch site. Conatec's proposal to launch microgravity experiments on a sounding rocket is just one example of the kinds of innovative payload proposals being submitted to DOT for its approval. Given the emphasis the new space policy places on the commercial sector to supplement the nation's launch and other space-based capabilities, we expect an increase in both conventional license applications, as well as those dealing with new approaches such as a commercial launch site.

The increase in the number and type of launch activities being proposed has been accompanied by an increase in both the number and complexity of operational issues that the Department must resolve. The most critical issue the Office of Commercial Space Transportation will face in FY 1989 will be our ability to complete the necessary analysis upon which to base licensing decisions. This nation has no history in regulating a commercial launch initiative and dealing with safety issues on a commercial basis. This is the first time that the federal Government has ever been called upon to establish a foundation for regulating privately conducted launch activities. The United States Government has conducted launches for 30 years, but the data base required to manage DOT's commercial launch program is not aimed at learning how to conduct launches, nor to duplicate existing NASA or Air Force data on how to build or launch rockets. Rather, it relates directly to the Department's ability to develop licensing

procedures and safety standards that are appropriate for private entities conducting commercial launches.

In the absence of such analyses, the only way to go about our task would be to apply the most conservative, rigid, fail-safe evaluation criteria. Needless to say, such an approach is inimical to commercial growth in any sector and is not the way this Department prefers to address its responsibility for any transportation industry. It is an approach that would be particularly onerous to commercial space initiatives, where single projects cost hundreds of millions of dollars before they ever become operational.

But as we are called upon to evaluate and license commercial launch activities incorporating new technologies, the Office of Commercial Space Transportation's primary mechanism for analyzing the public safety consequences of such projects will be through research under contract. Only by conducting research in such fields as liability, environmental impacts, hazards analysis and similar areas can we build a regulatory environment that addresses legitimate Government interests while still being responsive to the needs of the commercial space sector. Without a firm analytical underpinning for our decision making, the Department will be unable to respond effectively to precisely the kinds of new launch vehicles and concepts which our enabling legislation sought to encourage.

Inadequate funding could result in delays in application reviews and the issuing of licenses, producing backlogs and seriously impeding commercial activities. One goal of the President's space policy is to encourage the development and use, to the maximum extent feasible, of U.S. private-sector space capabilities without direct federal subsidy. A functioning, responsive, timely commercial launch regulatory program is an important element in accomplishing that goal.

American firms have the resources and capability to compete successfully in the international launch market, as their number of contracted launches demonstrates. I hope, as I know all of you do, that our Government can provide them with the regulatory environment that will advance all the vital national interests associated with a healthy, diverse U.S. commercial launch industry.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR RIEGLE AND THE ANSWERS

Question 1. Mr. Stadd, how many launches a year do you project, both domestic and worldwide in 1989/1990 and on through 1998? How many satellites will be foreign and how many domestic, worldwide?

Answer. Given the uncertain nature of the foreign and commercial satellite communications market and unpredictable technology developments, predictions are very hard to make. Nonetheless, we estimate that U.S. launch companies will boost about 10 communications satellites per year into geostationary orbit through the period 1989–1998. We estimate about the same number for Ariane for the same time period. The Soviet Union and China will also provide launch services for their domestic communications satellites at a similar rate in the latter part of the next decade. There are about 70 communications satellites presently planned for awaiting launch in the 1990s.

Question a. How many launch organizations will be competing for this business, and how many of these are foreign, how many domestic?

Answer. There are currently 3 U.S. launch firms and 3 foreign launch entities competing for communications satellite launch services. The foreign entities are Arianespace and the Soviet and Chinese governments.

Question b. Are there any other purely commercial entities offering launch services in the world today, or is our industry the only one expected to compete directly with government-sponsored organizations?

Answer. Other than the U.S. firms there are no other launch entities that are "purely" commercial in the way that term is used in the U.S. context. Our firms are not owned to any degree by the government and do not receive any form of direct support from the government. Government policy has been directed toward encouraging American space-related commercial enterprises on a basis that is consistent with our overall economic philosophy. "State industries" are not a preferred means for producing commercial goods and services in the U.S.

Arianespace is partially owned by entities of the French and other European governments. However, it does conduct itself on a commercial basis in most respects. Moreover, it is the centerpiece of a European commercial space effort which has either spawned or actively engaged numerous industrial, commercial, and financial firms and which has attracted significant private capital.

We should recognize that the Chinese and Soviets are attempting to organize themselves as "commercial" launch services providers. Despite the efforts of these non-market entities to repackage themselves as commercial launch firms, however, the fact remains that motivations are not fundamentally commercial. Soviet and Chinese objectives appear to have more to do with garnering foreign exchange for their governments than with creating independent commercial competitors to Western launch firms.

Question c. Is it realistic to think that the Germans or the French would consider launching a satellite on anything other than an Ariane? Or the Japanese on anything other than the H–2 once it is operational? In other words, where is the bulk of the projected business going to come from, how large is the market that our companies are competing for and what are the long-term prospects for the commercial industry?

Answer. Although the Germans and the French as members of international organizations have voted in favor of using U.S. launchers for satellites of partial German and French ownership (e.g., EUTELSAT), there are currently no government payload contracts from these countries with non-European launchers. Since the Japanese H–2 will be in development until the mid-1990s, it is very likely that Japanese payloads will continue to be launched by U.S. launch firms.

Estimates of commercial and foreign payloads are difficult to derive due to the uncertain launch environment. We estimate approximately 20 communications satellite payloads per year requiring launch over the next 5–7 years, split almost evenly between U.S. and Ariane launches. These estimates do not include U.S. government payloads that will require a commercial launch.

Even without any new commercial communications satellite payloads, we believe that with the U.S. Government commitment to use ELVs (i.e. the Air Force procurements and NASA purchases of commercial launch services), there should be enough market to sustain the U.S. launch firms who are currently seeking to market launch vehicles, provided each pursues, to the fullest extent possible, costs savings as well as continued development upgrades while maintaining their overall reliability records.

New applications such as radiodetermination, mobile satellite services, and direct broadcast services may generate additional demand for communications satellites

requiring launch services. Because the market potential of these new services is difficult to predict, the resulting demand for launch services cannot accurately be projected.

Question 1(d). If we back out all Chinese satellites, all European satellites, all Soviet satellites, and all Japanese satellites after 1992, what are we left with in terms of a sustained market for launch services?

Answer. It is important to note that two of the six commercial communications satellites currently manifested on the Delta launcher are from developing countries, i.e., India and Indonesia. ARABSAT is moving ahead with its next generation of communications satellites, as are a number of countries in Latin America and Africa. In other words, a major market for communications satellites in the late-1990s will be the developing countries. Although some growth in the number of new North American satellites can be expected during the coming decade, it is possible that the increasing demand from developing countries will maintain the average of 20 communications satellites requiring launches from U.S. and European launch vehicles each year.

Mr. Stadd, in your statement you indicated that last July, the Commercial Space Working Group of the Economic Policy Council declined to support the industry's request for indemnification. The group concluded that this sort of extraordinary remedy could not be justified for the launch industry. The members of the group also noted the industry's own failure to demonstrate that the absence of such support—government indemnification—would hamper its ability to compete in the international market against foreign launch systems, all of which are indemnified by their governments.

Question 2. Has anything changed since last July when this analysis was conducted? Is this still the Administration's position?

Answer. The Administration remains concerned about the issues it identified in the course of this analysis. While we continue to oppose unlimited indemnification, we want to work closely with the industry and Congress to achieve a more appropriate allocation of the risks associated with U.S. commercial launch activities.

Question 3. What were the basic arguments for and against indemnification at that time? What was your position?

Answer.

Arguments For:

Limiting the liability of commercial firms would level the playing field internationally.

Some form of limitation on launch operator liability, backed by Government action, would be consistent with previous NASA shuttle policies and (since 1979) with NASA ELV policies which authorized indemnification of launch customers in excess of required insurance protection.

Action to limit launch operator liability may provide greater business stability. Investors and corporate directors may be encouraged to commit increased resources to commercial launch businesses without the threat of incurring open ended liability.

Any action taken could be made provisional. This approach would facilitate development of a commercial industry for a set of launches during a fixed period. The Government would then have time to pursue alternative or collateral arrangements (including discussions with other launching states) while gaining experience in determining the actual risks involved.

Arguments Against:

Action by the Government to solve perceived problems in the space liability area may be premature and unnecessary. The extent of the problem and the potential effects of any actions the Government might take are not clear at this point.

Indemnification may be unnecessary. Prior to the advent of the Shuttle, U.S. firms launched numerous commercial payloads as NASA contractors without either the launch firm or the owners of the commercial payloads involved having been indemnified.

The Government would assume another contingent liability. If claims were brought against the Government, it would be necessary for the Congress to appropriate additional funds, or for the Department of Transportation to curtail or eliminate existing programs in order to pay the claims.

Titan, Delta, Atlas Centaur and Scout have the highest reliability ratings of any expendable launch vehicles. It may well be that the reliability will be sufficient (at least for the near future) to persuade INTELSAT and other launch customers to keep their business in the U.S. even if the Government declines to take action to limit third party liability.

The Department of Transportation presented an exhaustive analysis of the options availiable to the Administration to address the problem of excess liability. It did not take a formal position on which option should be adopted.

Question 4. Can the Committee receive a copy of this Commercial Space Working Group analysis?

Per instructions from the Administration we are not able to provide that document to the Committee.

The AIAA report states that a series of U.S. policy decisions has shifted space transportation responsibilities to the private sector but without making private sector insurance/government indemnification risk allocation available.

Question 5. Was any thought given to the insurance question when these policies were formulated? What was contemplated for an insurance regime as part of the commercialization initiative?

Answer. At the time of the commercialization initiative, both the Administration and Congress had anticipated that the launch industry would be able to operate under normal commercial insurance arrangements. No arrangements for providing insurance or limiting liability were adopted as Administration policy or included in the Commercial Space Launch Act. Significant problems first arose in the context of the Martin Marietta/Intelsat contract regarding the issue of potential unlimited liability.

In July of 1987, when the Administration's initial response to industry requests for relief was made, it was understood that liability insurance would generally be available. What was not known was whether coverage would be available at previous levels, because underwriting immediately following the Challenger accident and the accompanying ELV failures had been in the $300 million range. Such coverage has now proven to be available. The real problem, however, then and now, was coverage for excess or unlimited liability (regardless of coverage limits) and whether the absence of a remedy for this problem impairs the international competitiveness of U.S. launch firms.

Question 6. Based on your knowledge of the U.S.-European Space Agency discussions, is it fair to say that both the U.S. and the French have subsidized their expendable launch systems and that the differences are less significant than were originally thought?

Answer. European Governments, through the European Space Agency (ESA), have in the past provided direct subsidies to Ariane commercial service though pricing policies applied to launchers of ESA payloads. Ariane also benefits from its commercial arrangements with the French Government governing its access to the launch facilities at the Guyana Space Center. The U.S. provides no direct subsidies to its commercial firms although American firms do benefit from economies of scale associated with concurrent production of launch vehicles for government and commercial launchers and from cost sharing (under direct cost principles) in connection with joint use of government range facilities. France continues to indemnify Ariane launches for third party liability that exceeds insurance coverage.

Question 7. If neither the Adminisration's proposed legislation nor the Congressional proposal are enacted, will the U.S. commercial expendable launch vehicle industry be able to compete in world markets?

Answer. In the current environment, U.S. commercial launch firms are signing contracts at a pace exceeding that of foreign competitors. Obviously, many factors will determine whether the American commercial launch industry is successful, just as many factors—including an appropriate policy environment—will determine whether overall U.S. commercial space goals are successfully achieved.

Question 8. Is it not the Administration's intention to waive all first party claims above reasonable insurance levels—even if the total damages exceed the value of that insurance? Why doesn't this action constitute a direct subsidy?

Answer. The Administration has stated that it will waive its claims for damage to government property that exceeds the amount of insurance required by the Department of Transportation, unless the damage results from willful misconduct or reckless disregard. This arrangement represents a reasonable and appropriate underscore of the risks involved in commercial launches, and is not a subsidy. It should be noted that, until now, the government has not required property coverage for launch activities conducted for the benefit of private commercial customers. Each time the Shuttle or an ELV launched a payload for a commercial customer, these facilities were placed at risk.

Under the new arrangement, government range facilities will be insured against all foreseeable damage. In return for such coverage, the government has agreed to assume the risk of unforeseeable loss. This contractual arrangement benefits both

parties and will be implemented by DOT through its regulatory process and through agreements covering commercial activities at government facilities.

Question 9. Does the Ariane launch system directly subsidize the insurance costs associated with the launch of their ELV? What about the Long March system?

Answer. Arianespace's initial launch services agreements included liability insurance in the launch cost. Current agreements include separate insurance charges. Arianespace has stated that it purchases insurance on the world market at competitive rates. Arrangements for the Long March are still being developed. It is anticipated that Chinese launch contracts will provide government indemnification.

Question 10. Does the Administration have any evidence that U.S. commercial ELV firms can compete with foreign systems without any direct subsidies? What type of "indirect" subsidies is the Administration willing to provide?

Answer. The best evidence is that they are doing so now. The Administration opposes that provision of subsidies to this industry. This policy is reflected consistently in national space policies and directives.

Question 11. Does the Administration's objection to indemnification stem from an objection to the concept or to the fact that industry has failed to establish the justification for this type of protection?

Answer. As explained previously, the Administration objects in principle to government indemnification of private commercial enterprise. It has consistently opposed in a variety of industries.

Senator RIEGLE. Very good.

Mr. Frankle, let us here from you at this point.

STATEMENT OF EDWARD A. FRANKLE, DEPUTY GENERAL COUNSEL, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. FRANKLE. Mr. Chairman, Mr. Danforth:

I am pleased to have this opportunity to share with you NASA's views on H.R. 4399, with emphasis on the liability issues which we are going to talk about today. In discussing these issues, I will try to incorporate into that discussion NASA's prior practice.

And in making these comments, I would like to stress that the primary thrust of H.R. 4399 is to further facilitate commercial access to outer space, and NASA totally supports this objective.

Moving right to the bill, however, which is I guess what we want to stress here, NASA feels that section 4 of the bill is probably the most controversial section, and it relates to the insurance requirements of a license under the CSLA. It addresses third party liability insurance, property damage insurance, indemnification, and cross-waivers. I will discuss each part briefly.

Under the provision for third party liability and for loss of property of the U.S. Government, the bill introduces a concept of maximum probable loss. This concept is not defined and, in light of the history of space launches, we feel that the definition of such a term could prove difficult, and perhaps a definition would be in order.

Specifically with respect to third party liability, we feel some questions remain to be answered. For example, is the loss of the use of property or consequential damages, such as the delay of a third party's launch or payload, covered by the insurance? I cannot tell from the bill's language.

With respect to insurance for loss or damage to U.S. Government property, we certainly support the President's commercial space initiative, that the Government waive claims above required insurance as long as the insurance is of a sufficient amount to cover all credible accidents.

The bill's language allowing insurance to be for the maximum probable loss, but in no event more than $100 million or the maximum insurance available on the world market at reasonable cost, whichever is less, introduces a troubling degree of uncertainty to this concept. And I share General Moorman's and Mr. Stadd's views on that.

Further, as written the bill may not cover loss of Government property caused by the Government or its contractors or subcontractors in support of the commercial activity, and thus may well defeat the purpose of the insurance itself.

I believe that this omission would just encourage litigation and confusion when there was important property to replace and no insurance proceeds or appropriated funds to replace it.

The $100 million may also be a direct Federal subsidy if the coverage is not sufficient to cover the damages, as pointed out by General Moorman.

Subsections (c) and (d) of new section 16 of the CSLA deal with reciprocal cross-waivers of liability. Such waivers, relating primarily to property used in the space launches, started with NASA to facilitate the use of the space shuttle.

This policy was restricted to a limited period of protected shuttle operations at the launch site and was at least in part based upon our knowledge that the payloads met the stringent safety standards of the shuttle. It is not clear that those same conditions apply in circumstances presented by the CSLA amendments.

Furthermore, the NASA cross-waiver was carefully written so as not to interfere with contractual rights between contractors and subcontractors. The proposed language would apparently require that even breach of contract claims be waived between those contractors and subcontractors.

Several other potential problems also exist with the cross-waivers as written. In the interest of brevity, I will list some of the more important ones.

First, it may require employers, including the United States, to secure waivers from its employees not to bring a claim for injury. This is well beyond anything NASA ever did and would certainly impact things such as workman's compensation laws and the rights of contractor employees to recover under the Federal Tort Claims Act.

The cross-waiver of the United States Government is confusing since it applies only to the extent that the claim exceeds third party or Government property insurance, unless the claim involves willful misconduct or reckless disregard of the U.S.

For the first time, the inclusion of third party liability I think muddies up the issue, and in fact the whole question of whether a cross-waiver in light of the property insurance is raised and needs to be addressed.

The Secretary of Transportation, on behalf of the United States, its employees, contractors, and subcontractors, is directed to enter into reciprocal cross-waivers. It is not clear to me that this bill provides enough legal authority for the Government to waive the claims of its employees or contractors or subcontractors without compensation or agreement.

Fourth, the cross-waiver does not appear to apply between entities working under separate licenses, so that if one company's personnel working on a payload in, say, a payload processing facility damages another payload that also is in the facility or the next bay over, there does not appear to be a cross-waiver.

Fifth, the prior NASA cross-waiver was limited to actions at the U.S. Government launch site, and it appears that the bill would apply anywhere in the world, greatly expanding its scope.

Sixth, it is unclear if a cross-waiver would apply to licenses for operation of a launch site, since they only refer to launch services.

Seventh and one that everyone I think needs to think about strongly, section 16(b) of the bill provides for Government indemnification of claims not covered by insurance. Well, NASA did in the past provide some indemnification under section 308 of the Space Act, or Public Law 85-804.

That was based on the use of NASA launch vehicles, significant insight into the payloads carried, and the performance of the launch by NASA. Thus, in the past NASA had significant insight and controls over all phases of the vehicle payload launch.

In the era of commercial launches, these controls are loosened considerably and it may not be that the same conclusions should be drawn.

Further, indemnification is not consistent with Administration policy, as pointed out by the previous witnesses.

Moving quickly to section 5 of the bill, that section deals with certain launch incentives. This section provides a direct subsidy of certain launches. Direct Federal subsidies of this nature are inconsistent with Administration policy and could undermine the United States Trade Representatives discussions of free and fair trade in international launch services.

Furthermore, the fact that the U.S. may not require payment for certain services does not mean that funds are available to pay for them. Thus, besides the obvious budgetary problems pointed out by General Moorman, there also are potential legal problems from violations of the Anti-Deficiency Act, which is 31 U.S.C. 1341—or 31 U.S.C. 1301, which could occur unless further legislative relief was also obtained.

Finally, with respect to section 6 of this bill dealing with preemption of satellites, I believe that a definition of imperative national need is needed before we can take a firm position on the wisdom of that provision.

Those are the highlights of NASA's concerns on H.R. 4399. You also requested me to answer one specific question. That is, is the success of a commercial ELV industry in the United States dependent upon enactment of legislation along the lines of H.R. 4399?

On that question, I must demur. My expertise is not in the area of industrial success. You need to talk to the E.L.V industry, the insurance industry, and the user community to decide that.

If it is, however, I admit to some puzzlement why this one industry is different from other high risk industries, like aircraft manufacturing, pharmaceutical manufacturing, and chemical manufacturing, which also face large potential liability, yet have no indemnification over available insurance.

That, however, is a problem properly before you for resolution, Mr. Chairman.

That concludes my prepared statement and I would be pleased to answer any questions you or other members may have.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR RIEGLE AND THE ANSWERS

Question 1: What is the current NASA position with respect to insurance or indemnification in the purchase of launch services?

a. Will Section 308 or 504 authority be extended for government payloads? If not, will the price paid by the government have to be higher to reflect insurance costs? If so, how much higher?

b. Conversely, will the price paid by the government be lower if indemnification is extended, and would this indemnification be both first and third party?

c. If indemnification is going to be extended in these circumstances, why there but not for the commercial launches?

d. Will the government indemnify the GOES spacecraft or purchase insurance? If the latter, what is the estimated cost?

Answer 1a and b: The decision to utilize Section 308 or P.L. 85-804 indemnification authority with respect to government payloads will continue to be made on a case-by-case basis. The expected effect of the indemnification decision on the government's price will be a major factor in the case-by-case determination and probably will vary considerably depending on perceived risk, market conditions, competition available, whether the proposed indemnification is first dollar or above some level of required insurance. All these factors will be considered in determining if indemnification of a government launch is justified.

Answer 1c: In cases where indemnification has been given, it usually has been extended to vehicles and launches controlled by the government to appear to save taxpayer dollars by avoiding a direct pass-through of insurance premiums or because the firm providing the launch of an important government payload would not accept the launch contract without indemnification. In both cases, there was a distinct federal interest served by providing indemnification (i.e., appearing to save tax dollars or obtaining a federal launch). When the government indemnifies a launch, it assumes the risk of loss. Thus, it is exposed to the possibility of making payments for claims that may exceed the premium saved. In the event that claims exceed amounts available in the agency's budget, it would be necessary for the agency to request a supplemental appropriation to pay the claims. Absent a supplemental appropriation, payments for claims by the agency would be at the expense of agency programs. In a commercial launch, the information available to assess risk is much less, money saved on insurance premiums is usually corporate money instead of public money, and the federal interest in a given commercial payload is less than in one authorized and paid for by the government.

Answer 1d: The contract for the GOES launches specifically states that indemnification will not be provided. The contract also permits the government to direct the purchase of insurance for third party liability at least 30 days prior to an established launch

date. The cost of this insurance would be a direct, unburdened pass-through.

Question 2: Can you describe our obligations under this treaty; is it, in fact, strict liability?

Answer 2: The Convention on International Liability for Damage Caused by Space Objects provides, in Article II, "A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight." Since the term "launching State" includes "a State from whose territory or facility a space object is launched," this is, in fact, a strict liability standard for damage in those circumstances. In the event of damage covered elsewhere, Article III provides that the launching state shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

Question 3: So, if this legislation were enacted, there would be a level of insurance for the U.S. to claim against in the event the treaty were invoked?

Answer 3: Yes, as long as the insurance covered the damage that actually occurred.

Question 4: What is the exact payment mechanism contemplated in the bill? Where is this fund located; is it simply a draw on the general treasury? Are funds available in the amounts required under this bill, or will additional action in the Congress be required?

Answer 4: The Treaty does not contain a payment mechanism. It does provide for a claim to be submitted to the launching State through diplomatic channels within one year of the damage. If the claim is not resolved within one year, there is provision, for establishment of a three-member Claims Commission which, according to Articles XIX, can render a binding decision if the parties have so agreed. Otherwise, it renders a recommendatory award which the parties consider in good faith. For a discussion of the exact mechanism the U.S. would follow, we defer to the Departments of State and Justice.

Question 5: What role, if any, did your office play in the formulation of this veto message?

Answer 5: NASA concurred in the Statement of Administration Policy on H.R. 4399.

Question 6: What information or data does the Administration have to support their position that this legislation represents "excessive" and "unnecessary" federal subsidies?

Answer 6: NASA defers to the Departments of Transportation and Air Force.

Question 7: What is the Administration's estimate of the total cost associated with waiving the direct cost associated with the use of government ranges for commercial payloads that were bumped from the space shuttle?

Is the real issue with this objection the fact this is a "substantial" subsidy or that the Air Force would be required to absorb this expense?

Answer 7: NASA defers to the Departments of Transportation and Air Force.

Question 8: Is it not the Administration's intention to waive all first party claims above reasonable insurance levels -- even if the total damages exceed the value of that insurance? Why doesn't this action constitute a direct subsidy?

Answer 8: NASA defers to the Departments of Transportation and Air Force.

Question 9: Does the Ariane launch system directly subsidize the insurance costs associated with the launch of their ELV? What about the Long March system?

Answer 9: I do not know how insurance costs are handled by Ariane or Long March.

Question 10: Does the Administration have any evidence that U.S. commercial ELV firms can compete with foreign systems without any direct subsidies? What type of "indirect" subsidies is the Administration willing to provide?

Answer 10: The number of signed launch contracts would seem to indicate that competition is possible. Also, it would seem that before an extraordinary solution like indemnification of an industry is utilized, the need for it should be demonstra- ted, not the other way around.

Question 11: Is the Administration's objection to the reciprocal waivers requirement the result of the standard used in H.R. 4399? For example, would this objection still exist if there was an exclusion for situations where there was not "governmental negligence?"

Answer 11: NASA's objection to the cross waiver in H.R. 4399 is based on the standard used and the fact that the government may not have any real control of the risk to its property when dealing with a commercial launch for a commercial customer.

Question 12: What evidence does the Administration have that the reciprocal waiver provision would interfere with the "ability of the ELV industry to enter into commercial space launch contracts?"

Answer 12: For firm evidence, I defer to the Department of Transportation for a full answer although it would seem that, if a launch customer were required to enter reciprocal waivers with a U.S. ELV launch provider but not with a foreign launch provider, it might provide an incentive to go to the foreign provider.

Question 13: Does the Administration's objection to indemnification stem from an objection to the concept or to the fact that industry has failed to establish the justification for this type of protection?

Answer 13: Indemnification by the government is an extraordinary remedy which should be used only when there is no other alternative. However, the Administration has long opposed government indemnification of private commercial enterprises.

Senator RIEGLE. Thank you.

I want to make sure then that I am clear as to the bottom line here, and so I will put this question to each of you. In a sense, you have just answered it, so I am not sure you need to answer it again. But is it the position of the Administration as you each represent part of it that legislation, either the Senate version or the House version, that kind of legislation is not required, that some bill along this line is not required, in order to enable us to have a successful and health commercial ELV industry?

General MOORMAN. Mr. Chairman, my sense of that is much like the representative here from NASA, in that that question really is best put to your second panel here. But the Air Force can support and can work together creating a viable industry, I believe, without the legislation.

Senator RIEGLE. Mr. Stadd?

Mr. STADD. I do not want to punt the answer to that, Mr. Chairman. I think that we have a dilemma, which is—as I mentioned to one of your staff people, I wish we were having the hearing almost six months or a year from now.

The reason for that is that there is so much learning curve going on so fast. On the other hand, I have to be honest. Part of the mandate to my Department is for me to convey to you what the industry is saying. The industry is saying the market is fragile. The industry is saying they are out there competing against non-market actors in many cases, and in those cases where there is some semblance of market behavior, Governments are standing up and providing indemnification almost from the first dollar up.

It is a very tough, competitive world that we are thrusting our American ELV's into.

You asked if we need the legislation. I think that parts of the legislation are commendable. The property provision is one that we already are seeking to incorporate. Clearly, to the extent to which the statutory language helps put that into concrete, if you will is very helpful. Right now I am working that through case-by-case determinations, and ultimately through a rulemaking.

Do I believe this legislation is required for the survival of the industry? I do not know. I have anecdotal evidence that suggests that parts of it would be useful. But I think my judgment would be it is, at least from my Department's standpoint, it is very uncertain.

Senator RIEGLE. I think you have in a sense answered it. Do you want to elaborate on what you said earlier?

Mr. FRANKLE. Well, Senator, I just think that I have not seen it demonstrated yet, and that is what needs to be done. And then I would just defer to Mr. Stadd.

Senator RIEGLE. Is the committee then correct in concluding that at the present time none of the agencies of Government that you represent are prepared to support the legislation that is before us? Is that a fair bottom line?

General MOORMAN. Not as written.

Mr. STADD. That is correct.

Senator RIEGLE. We need an audible noise so that it can go into the record.

Mr. FRANKLE. As written, we at NASA feel that changes need to be made, and after those changes are made for the need we would defer to Transportation to see whether we would support it.

Senator RIEGLE. Now, if the Administration's avowed position is against third party indemnification, how do we explain the current rulemaking at the Department of Transportation, that appears to waive all claims above a minimum insurance level for first party damages?

It seems to me that that is indemnification. But what exactly is the basis for the Administration's opposition to third party indemnification?

Mr. STADD. Mr. Chairman, if you will allow me to play lawyer for a moment, and I do not have the credentials to do that, but I have to defer to what counsel tells me is proper.

I understand that under the first party waiver, you were agreeing to pay the claim for another party. In the case of the property waiver, the United States has agreed up front to waive that right and absorb the recovery of damages beyond the level of insurance we require.

To the extent to which the committee needs a more lucid response, we could of course provide that for the record.

Opposition to indemnification is based on several reasons. One I've already mentioned is the fact that we have opposed providing that form of assistance in other industry sectors.

Secondly, there are those in the insurance industry who have conveyed to us that there may well be a market for excess liability. There are those who have suggested that the excess liability market in fact never evolved in the nuclear industry partly because we had provided indemnification to the tune, I think, of $560 million in the former legislation.

The committee will also, I think, recall that Congress has now ramped that indemnification threshold up to $7 billion, which makes indemnification almost a moot issue, from what I am told, for the nuclear industry.

It is our view that the most contentious parts of this insurance equation has to do again with the punitive, so-called non-economic damages part. And we have attempted to address that through the approach I outlined earlier.

Third is the feeling that, the anecdotal concerns of the industry notwithstanding, companies have been able to sign contracts and that it is not apparent, at least at this point, that the absence of indemnification is a show-stopper.

Fourth and finally, it is our view that there is sufficient coverage and capacity in the insurance markets today to cover what in our judgment—and I think my colleagues at the Air Force would agree—would be the maximum probable loss scenarios that we would project for the industry at large.

Senator RIEGLE. Senator Danforth, do you have a statement?

OPENING STATEMENT BY SENATOR DANFORTH

Senator DANFORTH. Mr. Chairman, I first want to thank you for calling this hearing of the Science, Technology, and Space Subcommittee on an issue of considerable interest to our emerging commercial expendable launch vehicle (ELV) industry.

As a cosponsor of S. 2395, I also am interested in ensuring that our domestic commercial ELV industry is able to compete "fair and square" with its foreign competitors. It is no secret that foreign ELV systems enjoy certain Government subsidies that give them distinct advantages over our own commercial ELV industry. Just as I have advocated over the last several years relative to a global trade bill, we need to establish a "level playing field" on which our own commercial ELV industry can compete on more equal terms.

By most accounts, our foreign competitors enjoy the advantage of Governmental indemnification of third-party claims that might arise from launch accidents. Today's hearing will allow the Subcommittee to examine how and to what extent this advantage has affected our own ELV industry's ability to compete for the global communications satellite market. In addition, today's hearing will focus on S. 2395, which would seek to remedy this situation by establishing a risk-sharing arrangement among launch providers, their customers, and the U.S. Government.

Mr. Chairman, I believe that this legislation makes good sense and could help ensure a robust commercial ELV capability. It addresses one of the most acute problems facing our commercial ELV industry—the ability to compete on equal terms. I look forward to examining these and other related issues and am sure that today's witnesses will provide us with valuable insight into these important issues.

Mr. Chairman, thank you very much.

I am a layman and I am not completely familiar with the details of what an ELV is and its launch. Specifically, what is an ELV?

General MOORMAN. Expendable launch vehicles. It is——

Senator DANFORTH. I know that much.

General MOORMAN. What we are talking about are Titans, Titan III's, commercial Titan III's, Atlases, Deltas.

Senator DANFORTH. And boosters is the short word for them?

General MOORMAN. Yes, that is probably the easiest way to define it.

Senator DANFORTH. Now, they are used for what purposes?

General MOORMAN. Transportation of satellites to orbit.

Senator DANFORTH. And a private firm is involved in doing this? What exactly is the nature of the business?

Mr. STADD. Well, you have a combination, Senator, of actors.

We are dealing with the large manufacturers, being Martin Marietta, General Dynamics, and of course McDonnell Douglas, who have built these expendable launch vehicles for the Government.

Senator DANFORTH. Expendable launch vehicles, meaning boosters?

Mr. STADD. Meaning boosters, that is correct.

And they, through their subcontractors, have the various motors and so forth built, and then they integrate these vehicles.

Senator DANFORTH. And they build these for the Government?

Mr. STADD. Yes, they have.

Where the Commercial Space Launch Act fundamentally changed the landscape, if you will, is that the Government, that had been both the range and launch operator for 30-plus years, suddenly, at least at the Federal ranges, we became a landlord.

And suddenly, Martin Marietta, McDonnell Douglas, for example, held title to the hardware and became, if you will, a vendor, no longer a contractor, a procurement contractor to the Government, as they were under the former regime.

Senator DANFORTH. So McDonell Douglas builds a rocket?

Mr. STADD. Yes, sir.

Senator DANFORTH. Then it enters into an agreement with whom?

Mr. STADD. In the case of the ranges, it would be with the Air Force, in which they contract for the range services.

Senator DANFORTH. For what services?

Mr. STADD. The range services, the support services.

General MOORMAN. Range services. As you know, they include the requisite operational entities, what you need to operate the radars, the command and control capability.

Senator DANFORTH. So McDonnell Douglas, would enter into a contract with the Government to build a rocket for what specific purpose?

General MOORMAN. Of launching in this case of what is in front of us today, of launching a commercial payload—a satellite—into orbit.

Senator DANFORTH. Whose satellite?

General MOORMAN. It can be anyone, international as well as domestic users.

Senator DANFORTH. Private users?

General MOORMAN. Private users, yes.

Senator DANFORTH. A TV network, for example?

General MOORMAN. I have not seen the manifest, but that comes certainly within the domain of what they are looking at.

Senator DANFORTH. So a private company, McDonnell Douglas, for instance, enters into a contract with the Federal Government for what reason?

General MOORMAN. To use the Government services, launch bases, property to buy propellants, to use the range network.

Senator DANFORTH. In order to deploy a satellite in space?

General MOORMAN. Yes, sir.

Senator DANFORTH. The issue before us is, in the case of a commercial launch accident, whether McDonnell Douglas or any other ELV launch provider, should be indemnified by the Government; right?

Mr. STADD. Senator, might I add something, because I would like to key off of your characterization.

Senator DANFORTH. I hope it is not a characterization. I am just trying to understand what is involved here. So if I am in any way wrong, please tell me.

Mr. STADD. Essentially again, for the last three decades or so the Government was it when it came to space transportation. We essentially owned the rockets, and these companies were agents of the Government who built these vehicles to Government specification. They launched them from Government-owned facilities.

We are now talking about a world in which McDonnell Douglas, for example, as a vendor builds a vehicle, and it shops around for a customer, and they may well be launching a Government payload. They may well be launching a commercial payload.

A significant difference: In the past when these launches took place, when the Government owned the vehicle, the Government was self-insured.

If I could recall to the committee's mind an accident that occurred about a year and a half ago with an Atlas Centaur launching a Fltsatcom. There was a loss, I think, on the order of $180 million, if I am correct. This is a total loss of booster and satellite, and they were carrying a Navy payload in that case. That was a loss to the American taxpayer.

In today's world when a McDonnell Douglas or GD enters a Federal facility to launch, they will be carrying insurance. When there is a loss, at least a loss that obviously can be covered by the insurance, the carrier for that company absorbs that loss.

I just wanted to make that distinction.

Senator DANFORTH. Do you believe it was a good idea to change our policy to begin relying on commercial space launches rather than Government launches of ELVs?

Mr. STADD. I think so, and I think the reasons for that go back to part of the record that we tried to build on this last year, to the effect that in the commercial market, for example, the Government was not a very good marketer. Even when the space shuttle was going full bore in the satellite market a few years ago, the French Arianespace corporation was succeeding in capturing 50, sometimes 60 percent or more of the market.

There are many regulatory constraints on a Governmental bureaucracy to engage in, if you will, innovative financing, marketing techniques and so forth.

I believe that the last six or seven months have witnessed examples of where a McDonnell Douglas, unfettered by the constraints of the Government in the marketing area, have shown that they could be

rather successful in capturing what I think is turning out to be a rather significant part of the market.

Senator DANFORTH. Is this the key to it? The idea of the change was to make us more competitive, more capable of capturing the world market?

Mr. STADD. I think clearly——

Senator DANFORTH. That should be the test for the policy in your opinion?

Mr. STADD. I think so, and I think, clearly, that is the finding in the Commercial Space Launch Act of 1984. That is important.

Senator DANFORTH. I cut you off. I am sorry.

Mr. STADD. I just wanted to add something else, Senator. These companies have these many years been building and, in fact, been managing the launches.

If you had witnessed the launch at the blockhouse, if you will, then at Cape Canaveral, you would see that the contractors for McDonnell Douglas and others were, in fact, very much involved in the operations.

So for the uninitiated who may have three or four years ago witnessed a Government launch and to those today witnessing a commercial launch, you really would find in many cases the same actors, except in this case the relationship is one of a service relationship between the contractor and the Government.

Senator DANFORTH. Let me ask you this. How competitive is the world launch market?

Mr. STADD. It is a highly competitive field.

Senator DANFORTH. Who are our major competitors?

Mr. STADD. Well, we could start with Arianespace, the European consortium which has been quite active since the beginning of this decade. We have been joined by the Chinese Long March program. Those are the primary actors.

The Soviets certainly have been trying to enter the market. The administration so far has opposed any allowance of western spacecraft.

Senator DANFORTH. Suppose NBC wants to launch a satellite. It can go to any of these competitors throughout the world; right?

Mr. STADD. Well, there are a couple of constraints. They clearly can enter into contracts with the French, Arianespace. In the case of the Chinese, the current position is that we will take it on a case-by-case basis. There is at least one western spacecraft manufacturer who is engaged in what the State Department calls a feasibility study. Once that company determines they would like to launch on the Long March, they then have to come back.

There is a caveat. The French have a reliability record of approximately 80 percent or so. They have launched something on the order of 20 plus launches.

The Chinese have had a number of failures. They are just entering the field, and the United States has the advantage of a reliability record somewhere in the upper 90s.

Senator DANFORTH. Presumably, we have the best equipment, the most qualified people, and the most reliable launch systems in the world, but the market still remains competitive. Businesses that want to launch a satellite can go to a number and, presumably, a growing number, of vendors; is that right?

Mr. STADD. That is correct.

Senator DANFORTH. Is the world launch market a big business or is it a frill?

Mr. STADD. It is far from a frill. My hope is that we are seeing the tip of the iceberg. We are dealing with approximately a billion dollar market. The bulk of that market that our industry is negotiating with is primarily made up of the satellites that were offloaded from the shuttle. There are a number of foreign entrants and new entrants.

We are talking in the industry of about a billion dollars at this point.

Senator DANFORTH. In sales?

Mr. STADD. Exactly, satellite sales.

Senator DANFORTH. Now, again, I apologize for being such a neophyte in this, but what is the risk about which we are concerned?

Mr. STADD. If I may just correct the record. The billion dollars represents the payment from customer to launch operator. Clearly from the standpoint of satellite revenues and so forth, it is a far, far larger number than that.

Senator DANFORTH. What is the risk?

Mr. STADD. I think the primary concern is twofold. In the very unlikely event that the range procedures, flight determination procedures, fail and the rocket goes awry and you have an off-range accident that involves loss of life or substantial property damage, that is one concern. It is that unquantifiable area of insurance.

Secondly, there are——

Senator DANFORTH. Probably huge but unknown?

Mr. STADD. That is correct.

Senator DANFORTH. It would seem difficult, therefore, to insure?

Mr. STADD. Yes, sir.

Secondly is an area of environmental concern. There is some concern by at least one company that there may be some environmental consequential damage associated with their propulsion system. We are trying to work with the Air Force to better characterize that risk area for the company.

I will defer to the Air Force if I am missing other——

Senator DANFORTH. I do not want an exhaustive answer. All I want to know is the approximate magnitude of the risk. Presumably, it is a huge risk?

Mr. STADD. Yes.

Senator DANFORTH. But difficult to assess.

Now, do you know if insurance is available now, or is it cost-prohibitive?

General MOORMAN. Yes, some insurance is available. I do not know the details of the cost. Mr. Stadd can speak to that.

As you might gather, we had a rash of problems, the shuttle, two Titan accidents, the Atlas Centaur. The cost of insurance has gone up substantially over the last two to three years, and that also impacts upon your deliberations today. It is just a more expensive proposition.

Now, my sense is that as we get back into the business and get back up to where these launch systems are the mid-90 reliability systems, then confidence will be obtained by into the insurance industry, and the cost of insurance will go down. But we are really at a high insurance cost period now. Mr. Stadd can probably talk to the specifics.

Senator DANFORTH. I really do not want to get into endless detail, but thank you very much.

Is it true that other countries indemnify their launch systems against claims that could arise from a launch accident?

Mr. STADD. That is correct, Senator. Arianespace, I gather, indemnifies over $70 million. I believe it is 440 million franks, roughly $70 million. Over that, the Arianespace consortia will indemnify.

If I may add a perspective, what we are attempting to do through the various risk studies that we are conducting—and with the Chairman's indulgence I would like to submit the findings of those studies to the Committee.

What we are attempting to do is to correlate the risk hazards associated with the specific launch event with the specific launch event.

What we have had over the last number of years is a case where the Government has requested the maximum amount of insurance to cover probable losses. It is a very difficult one to get your arms around.

Two weeks ago we announced insurance levels for the first licensee, a small suborbital company, Conatec, in this case, Senator, a rocket that does not make orbit, a so-called sounding rocket. We required the company to obtain a $10 million coverage for third party and $7 million for property. That was really the first time the Government had systematically studied the risks and safety history of a given commercial launch system.

Senator DANFORTH. Let me just say by way of observation, it seems from what I have heard that this is a big growing industry in which there is keen and probably growing international competition; that the whole basis for our Government's policy in this area is to enhance American competitiveness in this hotly-contested international area; that our international competitors do provide indemnification; and that this is an area where there are large risks, unquantifiable risks, and, presumably, difficult to insure at a reasonable cost.

General MOORMAN. I thought that is what you said before, sir. I would want to say something about unquantifiable, Mr. Stadd's comments on the studies that we have that have taken place. It is not totally unquantifiable. In the past, as he pointed out, the insurance industry insured to the maximum extent. There are things that you can quantify. There are variables that you can factor in: the size of the booster, what pad are you doing off, what azimuth do you launch out of, et cetera, and what is at risk in the adjacent areas.

So what he was referring to is that there is a systematic way to go about what is at risk, and the Air Force and DOT are in the process of doing that.

Senator DANFORTH. But the potential loss is significantly greater than, say, $70 million; right?

General MOORMAN. In some cases, yes, sir. I mentioned in the case of the Titan, which is the largest one under consideration here, it goes off the pad such that you could get up to $300 million worth.

Senator DANFORTH. Let me ask just one final question, and I thank the Chairman for his willingness to go along with me here.

Oftentimes it is argued that any effort to indemnity has a safety consequence that could result in a manufacturer becoming cavalier if he had little or no risk. However, it appears that in the case of space launches, regardless of whether the Government indemnigies the private launcher, the potential liability is so great that there would be no safety consequence in providing indemnification.

Would you agree with that?

General MOORMAN. My sense in that is it is a combination of the liability as well as the fact that these boosters are transportation for very high value payloads; that the Air Force is committed to working the safety side of this.

I believe the sense of your question was if you indemnify that somehow you would take more risk in the process.

Senator DANFORTH. You do not believe that a commercial launch provider will necessarily become less safety conscious if the Government provides indemnification for claims arising from launch accidents?

General MOORMAN. I do not believe that inherently. These are mature industries that have been serving the Government for years and doing this kind of service, very qualified industries in the case of the big three, Martin Marietta, McDonnell Douglas and General Dynamics.

Mr. STADD. Senator, I think there is almost a paradox here in the sense that I think the levels of coverage that we are discussing with the Air Force and with the industry are sufficiently high enough and we are being sufficiently conservative, balancing the need for the industry to be able to get coverages at affordable rates.

It is almost a paradox in the sense that if we ever had a scenario so catastrophic as to trigger the level of indemnification that we are entertaining here this morning, at least this citizen would submit that I wonder what the United States Congress, if I may be so bold, would abide by a commercial industry.

In other words, I think there may be a great deal of concern expressed on Capitol Hill as to the merits of a commercial industry, because when you get to catastrophes that exceed $100 million plus, those are extraordinary. You are talking extraordinary property losses perhaps involving human life.

Sometimes I wonder whether the very solution that has been set up to resolve the problem would not in itself be open to result in a change in the situation for which it was meant to address.

Senator DANFORTH. Thank you, Mr. Chairman.

Senator RIEGLE. Thank you, Senator Danforth.

You know, just following along for a moment on this point, I think it is very useful to try to put this in its sort of broad perspective.

I think what we are seeing here is the impulse to privatize that has been sort of Governmentwide the last few years being applied to the space program as it relates to commercial launches for the networks or whomever has to put a satellite up there.

It seems to me that as we try to go through that transition as a nation ourselves, when you put it on the international stage we are trying to do more or less in a free enterprise way what other countries do in a Government-sponsored way.

So you have these other international consortiums very substantially Government funded and protected and so forth. They have made decisions as nations to want to go that route for reasons of their own. We used to do it that way. Now we are trying to take the commercial launch side of this into the private sector.

I am not sure a lot of thought was given at the outset to these kinds of questions, because one of the first snags you run into is liability insurance if you have a gigantic accident. It is one thing if the Government is picking up the whole tab. It is another thing if you suddenly say, look, we are going to split this in half, and Government does this part and the private sector does this part. Then all of a sudden you run into these anomalies.

In the free enterprise system, one of the big anomalies is insurance. If you are going to try to create a viable international industry where you are going up against Japan, Inc. or European Space Agency, or whatever it happens to be.

I think we are right on the front edge of those problems. This is just one. I think the whole question apart from the argument that he makes about maybe you get more marketing pizzaz if you try to free enterprise the commercial launch industry is so, but it seems to me that what happens is that these issues keep curving around and they come right back to us because you get the Government as an integral partner in every single instance.

You have the Air Force saying wait a minute, these are our launch facilities, they are run by the Government, we need them for national security reasons, we feel much more comfortable—you did not say this, but implicit in it is you feel much more comfortable if you are running the show from A to Z so things are less apt to blow up, we hope, or go off range and land in some neighborhood and cause whatever scale of damage or difficulty or what have you.

So in a sense, it really poses a larger philosophic question as to whether we can take commercial space into the free enterprise sector, resolve in a neat way the anomalies, and go up against Government Space Company, Inc. on an international basis.

I am frank to say to you I do not know how that is going to work, because it is sa function of how deep are people's pockets if they want to really sort of test us in that way. I am open to the idea, but I am con-

cerned about precisely the kind of question that has brought us back to day where we are having a real difficulty.

We have three arms of the Government here that are really the space policy arms all saying that they are really troubled about a piece of legislation that the industry, the private sector industry, is going to come in an the next panel and say they must have this legislation if they are going to be viable.

So in a sense, this is one of those testing points as to whether the basic philosophy, the basic approach is really workable in the kind of world that we have.

I cannot help but sort of cross-connect this to our discussions in the Finance Committee on world trade, because we are talking in a sense about trading rules. It is one thing to have one kind of philosophy and trading concept as a nation, and then when you run into the rest of the world and they decide to do it in a different way, notwithstanding today's favorable trade data that has been produced, you can still end up with trade deficits above $100 billion a year and maybe there is not a nice, neat way to compete your way out of that huge hole because of the way the rest of the world plays the game.

So we have a very tough set of problems. I think liability insurance is just one of many because we are going to get to the point, too, of shared facilities. What happens when they want to go and you need it for national security purposes?

I see lots and lots of difficulties of dovetailing this sort of hybrid public/private approach and still being able to meet the world competition head on.

So in any event, I just wanted to add that elaboration because I think your line of discussion really helps to frame a contradiction here in terms of how the world is geared—and we do not, quite frankly, have the answers. We are trying to invent answers as we go step by step, and this is one of the very difficult steps where we are right now finding it very hard to craft the answer.

Senator Wirth, I know you have a great interest in this. Let me say to you, one of the items that brings us here today is the bill that you have introduced. So let me ask you if you have any questions you want to pose to our Government witnesses here who in one manner or another have all indicated that they have reservations about that?

Senator WIRTH. Thank you very much, Mr. Chairman. Thank you for having this hearing on this very important piece of legislation.

I also want to thank Mr. Danforth for his help in this and Mr. Bentsen as well.

Let me ask you, if I might, General Moorman, has the administration encouraged the Air Force to procure commercial launch services?

General MOORMAN. Have they encouraged?

Senator WIRTH. Yes.

General MOORMAN. Well, it is in the law and in the space policy, the national space policy. To that extent, yes.

Senator WIRTH. Mr. Frankle, you are from NASA; right?

Mr. FRANKLE. Yes, sir.

Senator WIRTH. Is it administration policy that NASA should procure commercial launch services?

Mr. FRANKLE. Yes. When we require require external launch services, we are encouraged and required to purchase commercial expendable launch vehicles.

Senator WIRTH. What do you do about the liability issue? Do you have an indemnification policy, or do you pay the insurance, or what?

Mr. FRANKLE. It depends on the payload itself, sir. If we are dealing with a Government payload, which is what most of our payloads are, we have a choice which is not really the same choice we have here because we do have legal authority under both section 308 of the Space Act and Public Law 85,804 to provide indemnification under certain circumstances.

If it is a Government launch, the choice is just whether we want to pay for the insurance or not. In most cases, since we know what the payload is we can get some insight into the vehicle, and we will indemnify that launch to save the taxpayer the money that would be used to pay for the launch.

Senator WIRTH. So the administration is following a policy of indemnification now; is that right?

Mr. FRANKLE. We certainly would be indemnifying on Government launches, yes, sir.

Senator WIRTH. What would the impact be on our commercial space launch industry if there were no indemnification, impact on that being in comparison with what the French are doing or what the Soviets are doing or what the Chinese are doing in an international marketplace?

Mr. FRANKLE. Are we talking about the commercial launch industry now? Senator, I just do not know. It seems to me that we are selling a lot of launches, and there is no indemnification.

Senator WIRTH. It seems to me that on the one hand you are saying that when you launch a Government vehicle you will indemnify, but on the other hand we do not know what the issue is on the commercial side.

Now, is there an inconsistency on that, do you think?

Mr. FRANKLE. I do not believe so. The Government launches that I was talking about are in support of Government programs and they are funded by the Government, and we have a choice of either buying insurance or indemnifying.

Senator WIRTH. You have chosen to indemnify. You have said that this was a significant problem on the cost side, and the Government for its purposes will indemnify the commercial launch vehicle.

But when you get on to the commercial side, it will not do so. Why is it necessary to indemnify on the one side and not on the other?

Mr. FRANKLE. On the Government side, it is part of our program to launch the satellite and to serve the Governmental purpose, and we as a customer of the service have decided in the instance we are positing to provide the indemnification effort to save money.

That does not mean it is in the Government's interest to, to use Senator Danforth's example, indemnify NBC or whoever is the person——

Senator WIRTH. Indemnify whom?

Mr. FRANKLE. He was using an example in his questioning of Mr. Stadd of an NBC satellite on a McDonnell Douglas vehicle. It should be up to the customer and the owner to decide if they want to pay for that insurance or not.

It is the same way that we, as the owner and user, decide what we are going to do with our payloads.

Senator WIRTH. But as we all agreed, it is established that it is Government policy to encourage and maintain a commercial launch vehicle capability in the country; is that right?

Mr. FRANKLE. That is true, but the question that is facing you now is whether the Government policy to support this industry should require that type of indemnification when other industries that we also support are not given that indemnification. That is a very difficult question. I do not know the answer to that, Senator.

Senator WIRTH. Thank you, Mr. Chairman.

I think that there is a fundamental contradiction in that response and in the administration's policy toward this. On the one hand, if you have something that the Government is launching for itself, it will insure and indemnify, and it uses commercial launch systems because that is national policy that we want to encourage that.

On the other hand, when we get into that system by itself and its ability compete with other national or, in the Europeans' case, European Community, we will not do so.

It seems to me that there is a fundamental inconsistency there driven by ideology but not driven by an analysis as to what our goals are as they are reflected in the existing legislation.

I think you were beginning to get at that as well in talking about the circular nature of this. You have to break in somehow, it seems to me, and I would assume that the way to do that is in the legislation on front of us and that which has just been introduced in the House. We will have that out in a different form than this one.

Thank you very much.

Senator RIEGLE. We have a vote on, and so I think we will end now with this panel. Other questions that we may have for you we will submit for the record.

I want to thank you for your testimony. We are going to adjourn the committee just long enough for us to make the vote.

In the meantime, I would ask that our next panel of five witnesses be ready to resume as soon as we come back, which should be in about 10 minutes.

The committee stands in recess for that period of time.

[Brief recess.]

Senator RIEGLE. The committee will come to order.

Let me ask those that are not seated to find seats.

We have five witnesses before us, and other members will be coming back from the vote here shortly.

We are going to start with you, Mr. Chamberlain, from Martin Marietta. I would like to ask that in each case we are going to make the statements a part of the record, and rather than just read through the statements I would like you to go right to the central issues on the insurance question, the legislation that we have, how you feel about it, why you think it is needed, and any recommendations you have for changes in it and so forth.

Also, of course, you have heard the Government witnesses before you, and so I know you have some reactions to that. We would like to get your reactions to those.

Senator Pressler had just come in.

Senator Pressler, I have just seated the second panel here who are the industry witnesses. We are here today to talk about this liability legislation. Before I call on the first witness, did you want to make a comment or two?

OPENING STATEMENT BY SENATOR PRESSLER

Senator PRESSLER. Mr. Chairman, I do apologize for being late; however, I have just left another committee session which will require me to return in order to make a quorum. I intend to spend some time here reading some of the statements.

I want to thank the witnesses and thank you. I do have an opening statement which I shall read and I want to say that this subcommittee should monitor closely the nature of the competition that this industry faces.

As global competition in all sectors of our economy intensifies, we are becoming increasingly conscious of establishing and maintaining a level playing field on which to compete. Certainly this should be our goal relative to our domestic commercial ELV industry.

A key issue as far as establishing a level playing field for this industry is risk management. The subcommittee has before it legislation which would establish a mechanism to help the industry manage its risks. Government indemnification of claims in excess of those covered by commercially-procured insurance appears to be the mechanism that has garnered the most support in the industry.

Since foreign launch systems utilize just such a mechanism, it is only logical that we consider a similar mechanism.

Mr. Chairman, today's hearing will help the subcommittee understand what exactly is at stake for our domestic commercial ELV industry as well as to what extent legislation is needed for this industry to compete effectively.

For a country that has grown up on ELV launches conducted and backed by the Government, commercial ELV launches are a new phenomenon that will not succeed without experiencing some difficulties. This is only natural, however, in any new industry.

Yet, given the unique and risky nature of space launches and the relationship that our ELV industrial base shares with our national security, we would be wise to do everything within our power to ensure that this commercial industry is able to compete on fair and even terms. We should not avoid competition, but only ask that the competition be evenhanded.

These are but a few of the factors we should consider as we examine the competitive environment of our commercial ELV industry. The witnesses today from NASA, the Air Force, and DOT should give us insight into the role of the Federal Government in regulating commercial launches and in the conduct of these launches. The panel of witnesses representing ELV manufacturers, satellite manufacturers, and insurance brokers should provide valuable information into the market forces affecting global competition. With these thoughts in mind, I welcome each of the witnesses and look forward to their testimonies.

Senator RIEGLE. I think we will begin in the order in which the witnesses are listed. So, Mr. Chamberlain, we will hear from you first, then Mr. Yardley, Mr. Kadar, Mr. Berry and Mr. Kenny in that order.

Mr. Chamberlain.

STATEMENT OF ROGER CHAMBERLAIN, VICE PRESIDENT, MARTIN MARIETTA COMMERCIAL TITANS, INC.

Mr. CHAMBERLAIN. Thank you, Mr. Chairman and members of the subcommittee. As you have requested, I am submitting a written statement for the record. I would like to summarize very quickly its major points and then save any response comments for the question and answer period following.

We do believe that a strong commercial launch industry is a key element in maintaining the American leadership in space and is a critical element of our national space transportation recovery program.

Critical to the success of this industry and to this recovery program we believe is a risksharing approach between the ELV companies and the U.S. Government in that remote event that damages resulting from a commercial launch accident would exceed the insurance coverage reasonably available in the launch marketplace.

As Martin Marietta proceeds in the commercial launch service business, our exposure to defined and unbounded space launch risk, however improbable, is our single overriding concern.

A strong precedence exists in the NASA authorization legislation for such a sharing of launch risk as was discussed earlier. This bill is based on this approach and is substantially similar to the House 4399, as has been discussed.

These bills are strongly supported by the launch services, the satellite manufacturing, the telecommunications and the insurance industries. Of particular importance is the fact that this approach does not in any way interfere with any individual plaintiff's rights that might result from this industry.

Under the proposed approach, the ELV companies would obtain third-party liability insurance covering all parties to the launch, including the United States Government.

They would also obtain insurance covering damages to U.S. Government property. This level of insurance would be determined by the Department of Transportation, as you know, and would reflect the maximum probable loss resulting from any accident.

This amount would not exceed $500 million in the case of third-party claims or $100 million in the case of the damage to U.S. Government property or the maximum insurance available at reasonable cost, whichever is less. Above these amounts, the U.S. Government would pay third-party claims and would self-insure against damage to its property. Cross-waivers would be required to cover all other damage to property or persons resulting from the launch.

Currently, we are required to obtain the maximum amount of insurance commercially available at a reasonable price as determined by the United States Government. Any excess of possible loss above this amount would be allocated in accordance with general principles of tort and contract law which subject us to unbounded risk.

For example, the current capacity of the insurance market to provide for third-party personal injury and property damage insurance is reportedly somewhere between $300 and $500 million. The maximum possible loss that might occur to third parties as a result of a launch accident is still well above that amount.

In the case of post-ignition damage to U.S. Government property, the situation is worse since no identified market capacity for this risk exists today because that industry is not developed on the insurance side.

Yet, the maximum possible loss that we could incur is very, very large. In addition, these risks could aggregate with the satellite launch risk insurance requirements, that insurance that would be purchased to replace the spacecraft, thereby further reducing the already inadequate insurance capacity currently available to cover our customer's loss of their spacecraft.

I must stress that the risk of maximum possible loss is very remote. In fact, as has been reported earlier today, no third-party claim has ever been filed. Were it to occur, however, it could very well be beyond the resources of any of our companies to handle. Each contract that we sign in anticipation of your favorable action in this area increases our cumulative risk.

Of additional concern to us is the fact that the current situation puts us at a competitive disadvantage internationally, as was discussed briefly by the Government panel. Foreign launch programs receive substantial support from the Governments. Ariane is held harmless by the European Space Agency and the French Government for third-party claims above, again, reportedly in the 400 million French franks area, or about $70 million and, as we understand it, from damage to launch facilities above a level that is significantly less than even the maximum probable case of loss.

In the case of the Proton and the Long March vehicles, the Soviet and Chinese Governments appear to assume all risk and can evidently price below their cost where their main driver is bringing hard currency into the country and they are not driven by relationship between price and cost.

This support allows our foreign competitors to realize savings in insurance costs that they can pass on to their customers. They also enjoy more favorable commercial risk environment that facilitates each new investment decision that they must make.

Our industry needs reassuring legislation to enable us to compete more effectively in this international marketplace.

In conclusion, I would like to say that in our decision to enter this new business, we were hopeful that the NASA precedent would be followed in legislation that would inexorably allocate risk between the commercial launch services industry and the U.S. Government. We have proceeded aggressively to develop our business on that basis.

If such legislation is not enacted, we may be forced to reassess our decision to expand our business in this market.

That concludes my remarks. I would be happy to answer questions as appropriate.

Senator RIEGLE. Thank you.

Mr. Yardley, we will hear from you now, please.

STATEMENT OF JOHN F. YARDLEY, PRESIDENT, McDONNELL DOUGLAS ASTRONAUTICS

Mr. YARDLEY. Thank you, Mr. Chairman.

Senator RIEGLE. I know you all have prepared presentations, but I want to narrow this down to the——

Mr. YARDLEY. You are going to put the——

Senator RIEGLE. Yes, we will put the full statement in the record.

Mr. YARDLEY. McDonnell Douglas is strongly in favor of the shared risk approach that this bill proposes. We see it as a very positive step toward eliminating some of the obstacles that face our industry and could inhibit the United States from realizing its goal of a viable, competitive launch industry.

Now, in listening to the remarks earlier, I think it was not clear to some of you gentlemen what the situation in the last 25 years has been. Up to, in fact, this point there has not been one private commercial launch. NASA did the launching. They bought the vehicles from us and paid us to launch them. That has not changed any.

They gave foreign commercial customers and domestic commercial customers supplemental free third party liability insurance. No Government property damage insurance was required.

The Government required the user to obtain $.5 billlion third party liability coverage (or the maximum available at a reasonable price), and covered anything over that amount.

That is exactly what your bill is doing, except you want property damage insurance coverage, and we understand that.

So if you got the impression from the previous discussion that what you are asking for in this bill is quite different than we have ever done, I think that is an incorrect impression.

We have signed five ourselves. Those are assuming we are going to get this bill. If we do not get something like this, we are going to have to take that risk on five, but number six is going to be a decision for the board of directors.

That is the kind of thing we are in. We are in a "bet your company" kind of thing in this third-party liability. So I want to make sure that you understand that is where we are.

Now, I do not want to mislead you. This is not the only problem that we face with foreign competition. It was stated that Ariane has a $70 million insurance requirement that the user must buy. We have per your bill $500 million. That in itself is a penalty.

But forgetting that, assuming that the bill is passed, we still have the problem of a free enterprise competing against foreign national Governments who want to subsidize to maintain their aerospace industries green. We have not yet figured out how to solve that.

Your bill does put in a provision encouraging discussions, although it is somewhat vague on who ought to talk to who. But we see that as a very important part of this bill.

I think I will quit and let our friends go on.

[The statement follows:]

STATEMENT OF JOHN F. YARDLEY, PRESIDENT, MCDONNELL DOUGLAS ASTRONAUTICS COMPANY

Thank you Mr. Chairman and distinguished members of the Subcommittee. I am pleased to have an opportunity to be here today to represent McDonnell Douglas and present my views on H.R. 4399, the Commercial Space Launch Act Amendments of 19BB. McDonnell Douglas is strongly in favor of this shared risk approach and sees this legislation as a positive step toward eliminating some of the obstacles that face our industry and could inhibit the United States from realizing its goal of a viable, competitive commercial launch industry.

We currently have four firm contracts to launch five spacecraft in 1989 and 1990. Additionally, we have five firm reservations to launch payloads through 1991. Unfortunately, a few near term contracts and reservations do not constitute a mature and viable commercial launch industry. It should be noted that in order to obtain these commercial contracts, McDonnell Douglas has had to address the liability issues associated with commercial launch of an expendable launch vehicle. Our acceptance of the total risk and our offer of indemnification must be considered a short-term business decision that we have made in an effort to take the first step toward establishing a U.S. commercial launch industry. Accordingly? I believe that if our industry is to survive over time in the face of foreign competition, a long term solution must be found. We are pleased that this Subcommittee is moving forward to help resolve the critical issues that face us.

This bill is important to us because, in essence, it provides a reasonable approach to risk allocation in the event that damages resulting from a commercial launch accident exceed the financial protection reasonably available from the insurance marketplace. To be more specific, under this legislation? launch companies would assume liability for what has been termed the "maximum probable loss". What that means is that private industry's maximum liability will not exceed the lesser of (1) the maximum liability insurance available on the world market at a reasonable cost; or (2) $500 million for

third party liability and $100 million for damage to Government property. The U.S. Government would assume the very remote risk of claims in excess of the required coverage. This shared risk approach is similar to that used by the Government when NASA furnished commercial launch services. He consider this provision to be essential in that it will then be unnecessary for commercial launch firms to put their entire company on the line, or to "bet their company" as they say, each time they participate in a launch activity.

Without some relief, such as the risk allocation provisions of the proposed legislation, our fledging U.S. commercial launch industry would have to continue to assume virtually all significant risks of loss or injury associated with a launch.

This burden quite likely would force us to consider carefully the practicality of continuing in the commercial launch business. Moreover, costs of insurance passed on to the customer would price us out of the competitive market in relation to our foreign competition. If we as a nation are to remain in the forefront of space endeavor and maintain our ability to compete in the world market, we must pull together to eliminate unnecessary impediments to establishment of a strong, domestic commercial launch industry. Only then can U.S. industry compete effectively with international competitors that receive substantial subsidies from their Governments in providing liability protection for their customers at little or no costs.

As a matter of national pride, foreign Governments are determined to have successful space launch programs and are taking steps to assure success. Both Europe and the Soviet Union are engaging in aggressive marketing to secure international customers for their respective launch systems. Faced with the requirement to compete in an international market where our competitors receive substantial direct and indirect support from their Governments, U.S. commercial launch contractors, such as McDonnell Douglas, may be forced out of the commercial space transportation market.

From a competitive point of view, the commercial launch industry will still be faced with a severe problem even if the proposed legislation is passed. Because of Governmental support, foreign competitors are now able to offer a price schedule that could undermine any efforts by U.S. firms to gain a creditable world market share. Therefore, we heartily endorse the provisions of Section 8 of the proposed legislation that would be included in the proposed legislation. Those provisions call for a dialogue with appropriate foreign Government representatives to seek the development of guidelines for access to launch services by satellite builders and users in a manner that assures the conduct of reasonable and fair international competition in commercial space activities. Such a dialogue could go a long way toward preventing the eventual loss of our domestic launch capability. Without a domestic launch industry, the United States could see its lead in space transportation and its access to space severely eroded by the early or mid 1990's.

We have noted with interest the Administration's new policy signed by the President on January 5, 1988. The policy seems to be complementary to the objectives of the proposed legislation and is designed to encourage private industry to set up a commercial launch capability that can compete internationally with those of Europe, the Soviet Union and China.

According to the announced policy, the Administration is planning to take administrative steps to address the insurance concerns of the U.S. commercial launch industry. Those steps include proposing to Congress that a $200,000 limit be placed on third party noneconomic damage awards. Additionally, the Administration wants to limit the liability of commercial launch operators for damage to Government property to the level of insurance required by the Department of Transportation.

We are interested in seeing how the Administration's new policy will be implemented and the Air Force has agreed to amend the USAF Model FLV Commercialization Agreement when the Administration's new initiatives are implemented or if new legislation is enacted. He are hopeful that the change in policy will indeed be a significant step toward resolving some of the issues we are addressing today.

In conclusion, I believe that the U.S. can retain its position over the long haul as the world leader in commercial launch services. However, this cannot be done unless we forge a partnership between Government and industry and remove the severe disadvantage launch service contractors face with heavily subsidized foreign competition.

Industry is not seeking a free ride, but an equitable distribution of the risks so that we will be better able to compete in the long run. The proposed legislation does that and McDonnell Douglas will assist in any way it can to ensure passage of this vital legislation.

Senator RIEGLE. Those were very useful comments, though, and I appreciate that. I think anything along the line that fills in the picture such as your comments have just done we certainly welcome. So feel that you have that latitude.

Mr. Kadar.

STATEMENT OF EUGENE KADAR, PRESIDENT, CONATEC, INC.

Mr. KADAR. Thank you. Mr. Chairman, distinguished members of the subcommittee, I am Gene Kadar, President of Conatec, and I am here to tell you about some of our insurance-related issues associated with what we refer to as our commercial research rocket launch operation.

These are significantly smaller launch vehicles with less dollars involved than that of larger companies with their larger launch vehicles. However, the proportion of liability with respect to our launch service costs are of equal importance to us.

We have been issued a launch license and two orders from DOT with respect to insurance requirements associated with that launch license. One being for personal injury and property loss, and the other being for third-party liability.

We were quite pleased with the terms and conditions of the third-party liability insurance requirements and the levels of minimum amounts of insurance required. We do have some concern on personal injuries; i.e., whether the personnel involved would require us to have workman compensation insurance for Government employees and Government contractor and subcontractor employees.

What we like about the House and the Senate bills is that they clarify some of the concerns we have. We feel that once this legislation is passed, our concerns will be alleviated.

We are faced with two alternatives if this legislation is not passed. One is that we will not only have to obtain the DOT established minimum amount of probable loss insurance, but we also have to increase our insured amounts to insure for maximum possible loss.

If we do not do this, then we must take a risk for any claims over the amount that we will be insured for under our DOT orders. For us to take that risk, our customer also has to take that risk—something they would not accept.

Our customers to date are located in Japan and Germany. Right now, their payloads are being launched by European launch systems from European ranges, and those launch programs are completely indemnified for third-party liability.

Our goal is to launch those programs from the U.S. using U.S. launch vehicles.

The legislation will place the U.S. commercial launch industry on a par with the foreign competitors by removing a major disincentive to utilizing U.S. launch service providers.

This legislation will strongly encourage the development of a robust internationally competitive launch industry. We believe the legislation is well drafted, and it satisfies the industry's needs for allocating the risks of liability.

One area which we would like to see in the modified draft is section 6, Preemption of Satellites. This provision is reasonable, fair and beneficial. However, we request that it be extended to commercial providers of suborbital launch services.

We suggest that the title be changed to Preemption of Launches and the wording "launches of satellites" be changed to read "launches of satellites or suborbital payloads." Such a change will enable Conatec and other research rocket launch service providers to assure their customers that their launches will not be unreasonably preempted and in the event of preemption that the launch service charges will be incurred only one time.

Conatec has a comprehensive insurance package which provides the amounts and types of insurance required by the DOT insurance orders issued to us. In addition, we also have insurance for relaunch and payload replacement assurance.

Our insurance package to cover the Government DOT requirements represents approximately 6 percent of our total launch services cost. Our relaunch and payload replacement insurance is less than 10 percent of the insured value.

We have obtained this insurance package for several launch programs. We have just completed supporting a launch program for two German payloads launched from a Swedish launch range where we provided basically all the analytical engineering and technical support, and program management aspects of the launch vehicle. The only thing we did not provide was the hardware and the integration of the total payload package.

We were able to offer our customer a comprehensive insurance package for all the operations. However, they declined it because they had already been indemnified by their range.

We believe all the quotes for our insurance package and all the elements contained therein are commercially practicable. We would like to point out that with respect to the market for insurance packages, we were only able to obtain insurance from the European market.

Our broker is U.S., but the only underwriters who would address third-party liability and property damage for the range are in Europe. Our broker feels that we do nothave a problem meeting any insurance requirements, based upon two programs for which we have already had quotes put together.

We strongly support the legislation before the subcommittee and respectfully request that it be acted on as quickly as possible. I thank you for the opportunity to discuss these issues with you and would be happy to address any questions you might have.

[The statement follows:]

STATEMENT OF EUGENE F. KADAR

Mr. Chairman and Distinguished Members of the Subcommi&tee. I am Gene Kadar, President of Conatec, Inc. I am pleased and honored to be here today to discuss the liability issues facing the commercial launch industry and the prospective legislation addressing those issues. This hearing is being held at a critical time in the development of this emerging industry. Government decisions on these liability issues will, to a very siqnificant extent, determine the future viability and international competitiveness of this industry. Since our company's business in the commercial launch industry is the provision of Research Rocket launch services (often referred to as .sounding rockets.), I address my comments on the liability issues which affect that segment of the industry.

I. BACKGROUND

Established in 1984, Conatec is an engineering and technical services company serving Domestic and International commercial and Government aerospace customers. The principals of our company each have over 20 years of direct experience with space technology. Currently we provide engineering and technical services in support of several European Research Rocket programs. We also support the National Aeronautics and Space Administration (NASA) through our on-going contract to provide mission analysis and launch support services for their Sounding Rocket Program. For several commercial spacecraft programs involving both Expendable Launch Vehicles (ELV's) and the Shuttle, and their attendant launch operations-related activities, Conatec provides engineering and technical services to British Aerospace PLC for the SKYNET and OLYMPUS spacecraft and to GE/American Communications for their SATCOM spacecraft program. To date, Conatec's business has been approximately 65% commercial and 35% Government. The requirement for our services has been increasing steadily and we expect our growth in this sector to continue.

In addition to our basic engineering and technical services, Conatec has formulated the first commercial Research Rocket launch service capable of launching moderate-sized payloads (up to 2,000 pounds) into suborbital trajectories which provide five (5) to twenty (20) minutes of space environment. Numerous Research Rocket configurations have been and continue to be launched by NASA and other U.S. and foreign Government agencies. Approximately three thousand (3,000) Research Rockets have been launched by the U.S. in the pas: thirty-five (35) years, with NASA accounting for approximately eighty (80) percent of these. During that period, Government agencies were the only source of sounding rocket launch opportunities. With the development of the Shuttle and the desire to use it as the sole access to space for moderate-sized payloads, NASA planned to phase out sounding rockets by 1990. This plan has had two major effects: 1) a stagnation in the development of advanced Research Rocket systems which could provide capability for additional experiment time and/or additional payload mass in suborbital trajectories; and 2) the re-directing of payload mission planning to take advantage of the Shuttle capabilities. However, the critical shortage in launch opportunities for the foreseeable future has once again made Research Rockets an attractive low cost option for moderate-sized payloads to gain access to space via dedicated launches.

Conatec initiated the development of a commercial Research Rocket launch service in response to requests from the commercial space community to accommodate specific mission requirements which could not be supported by NASA. Conatec addressed the technical and economic considerations involved in such an effort and concluded that the provision of a commercial Research Rocket launch service is both technically feasible and economically practicable. This service will utilize existing sounding rocket systems for its initial launches and will also include the development of advanced vehicle configurations to extend the envelope of suborbital research capabilities. Potential applications for this launch service include, but are not limited to, space processing/microgravity applications, basic research, and engineering development of space hardware. Our prior experience in managing NASA Sounding Rocket programs and the nature of our current engineering and technical services business places us in a very good position to undertake and provide this type of launch service.

The vehicle to be utilized for our initial launches, designated the C-310, is a Terrier Black Brant VC that was developed by NASA and launched thirty-two (32) times with 100% success. It is a derivative of the Black Brant family of sounding rocket vehicles that has an overall success rate of 97% associated with over 270 missions during the past 23 years. The C-310 vehicle provides 6 to 8 minutes of high quality microgravity environment (between 10-4 and 10-6 g's) depending on the payload mass. While the launch costs for large E.L.V's used to launch spacecraft are in the tens of millions of dollars, the fixed-price per unit total launch costs associated with Conatec's first launch are quoted at seven hundred seventy thousand dollars ($770,000). Launch vehicles of this class thus provide an economical means of conducting space-related research.

Conatec's series of research rocket systems currently consists of five (5) flight proven and four (4) advanced launch vehicles. All vehicles are based on two core flight-proven propulsion systems that are currently in-production and have a demonstrated high level of reliability. The advanced vehicle systems will more than triple the experiment time or useful payload mass that can be accommodated on existing U.S. sounding rocket systems.

Conatec's primary business in the launch services market is the provision of a turn-key launch service package similar to the package offered by the major E.L.V companies. This will include all services necessary to launch and recover a customer's payload. The only requirements on the customer will be to deliver the payload to the launch site for integration with the launch vehicle. Conatec's secondary business is the provision of engineering and technical support services for sounding rocket launches conducted by others. Conatec provided these services for the launch of two microgravity payloads on Nike-Black Brant sounding rockets from Esrange in Kiruna, Sweden just two weeks ago. Both launches were totally successful and the mission objectives of both payloads were fully achieved.

Conatec's initial in-house launch program addresses a mission requirement for launching two back-to-back C-310 vehicles from the White Sands Missile Range ("Range") during the second or third quarter of calendar year 1989. The present status of our activities is as follows:

We have received firm, fixed price quotations for all required goods and services and are prepared to begin contract negotiations.

A Launch Services Agreement has been prepared and submitted to our first customer in anticipation of negotiations.

The Department of Transportation Office of Commercial Space Transportation (OCST) has completed its mission and safety reviews of the proposed launches, and on January 21, 1988 issued Conatec a license to conduct these launches from WSMR.

On May 1988, OCST issued two orders establishing the amounts and types of insurance that Conatec will be required to have for these launches. Conatec will be required to provide $10 Million in third-party liability insurance and $7 Million for personal injury and Government property loss insurance.

A proposed Memorandum of Agreement ("MOA") for the use of certain NASA resources is under negotiation with the Agency. Conatec received a response to its original draft of an MOA on March 31, 1988 and has sent its proposed revisions to this document to NASA within the past week. Conatec hopes that an agreement can be reached shortly on the terms of this MOA so that negotiations on the Individual Support Agreements with the Goddard Space Flight Center for our first launches can begin.

The Department of the Army has reviewed Conatec's Phase I/II documentation for use of the Range and has tentatively agreed to accommodate our requirements pending execution of an agreement with the Department of the Navy, Naval Ordnance Missile Test Station ("NOMTS") for sponsorship.

NOMTS has agreed to sponsor and support Conatec's program with Naval Sea Systems Command approval. Conatec is currently drafting a proposed agreement for use of Range facilities and services.

II. THE LIABILITY ISSUES FACING THE COMMERCIAL RESEARCH ROCKET INDUSTRY AND THE PROPOSED LEGISLATION ADDRESSING THOSE ISSUES

A great deal has been said and written about the risks inherent in providing a commercial launch service to customer desiring to launch payloads into orbiTal or suborbital trajectories. The necessity for the provision of some form of protection by the launch services provider to cover potential third party liability claims or the claims of the Government for loss of or damage to property resulting from a launch activity is both reasonable and well accepted. The critical questions that must be addressed are the form and total amount of the protection that must be provided. The answers to these questions will be the fundamental factor determininq whether or not the United States will have a viable and internationally competitive commercial launch industry.

At this time, Conatec is competing with foreign providers of Research Rocket launch services for the provision of launch services in support of several programs. These competitors have one major advantage over our proposed services - they can offer the customer total protection from any liability either at no cost or at very low cost to the customer. Conatec, however, under the current Government requirements for insurance, must obtain commercial insurance for these risks up to the amounts determined by OCST to cover the "maximum probable loss" and may be liable for any damages in excess of those amounts. Since Conatec's customer would almost certainly be held jointly and severally liable for any such damages, our company is faced with two equally unpalatable alternatives—(1) we must purchase far more insurance than is necessary to cover the maximum probable loss in order to cover the "maximum possible loss", or (2) we, and our customer, must accept the chance that we may be held liable for damages far in excess of the amount of insurance purchased to cover the maximum probable loss. Under the first alternative, our launch service cost rises significantly and can easily make us non-competitive with foreign launch providers. Under the second alternative, the customer must decide whether he wants to take the risk of a major damage award being levied against him in the event that there is a successful claim, a chance he does not have to take if he elects to launch with our foreign competitors. The competitive disadvantages of both alternatives are thus obvious.

A reasonable solution to these problems has been proposed and is embodied in the language of H.R. 4399 and Senator Wirth's bill. We wholeheartedly support this legislation and believe that its enactment into law is necessary for the development of a strong, competitive U.S. commercial launch industry. Failure to enact this legislation will allow our foreign competitors to continue to offer a major incentive for the use of their services that we cannot match.

We believe the allocation of risks established by this legislation is reasonable and practical. The commercial provider of launch services provides full protection for all parties involved in the launch and the Government for the maximum probable losses that might result during a launch activity at no cost to the Government. In return for this coverage of all of the most probable risks of loss, the Government agrees to pay for damages that exceed the amount of the maximum probable loss. This risk sharing arrangement has several important effects:

(1) The Government obtains protection, at no cost to the Government, for all but the least probable losses that can arise during a launch activity.

(2) The commercial launch provider obtains protection from liability for damages resulting from those extremely unlikely but very expensive accidents that are theoretically possible. In all likelihood, given the use of Government-controlled range safety systems, such an accident will never occur and the Government will never have to pay any claims for such amounts.

(3) The U.S. commercial launch industry will be placed on a par with its foreign competitors who are providing equal or even better protection for their customers. By removing a major disincentive to utilizing U.S. launch providers, this legislation will strongly encourage the development of a robust, internationally competitive launch service industry with all of the benefits such an industry can provide our country.

We have reviewed this legislation in detail and believe it is well drafted and satisfies the industry's needs for a reasonable arrangement for allocating the risks of liability which may arise from commercial launch operations. There is only one area where we would like to see the draft of Senator Wirth's bill modified, and that is in Section 6, "Preemption of Satellites." This section is aimed at assuring those launch providers who launch satellites into orbit that their launch dates will not be unnecessarily preempted by the Government, and, in the event that they are preempted, they will

not be required to pay for the launch services involved in the preempted launch. We believe this is a very reasonable, fair and beneficial provision and respectfully request that it be extended to commercial providers of suborbital launch services. We suggest that the title of this section be changed to "Preemption of Launches" and that the wording on page 10 line 24 "launches of satellites" be changed to read "launches of satellites or suborbital payloads." Such a change will enable Conatec and other Research Rocket launch services providers to assure their customers that their launches will not be unreasonably preempted and that, in the event of a preemption, Conateo can not be repeatedly charged for the provision of the contracted Government launch support services.

III. CURRENT AVAILABILITY AND COST OF INSURANCE FOR COMMERCIAL RESEARCH ROCKET LAUNCHES

Conatec has worked closely with its insurance broker during the past several months to enable the insurance community to evaluate the levels of risk presented by Conatec's program and to develop a comprehensive insurance package to cover these risks. This package provides the amounts and types of insurance required by the May 9, 1988 OCST orders (i.e., $10 Million in third party liability and $7 Million in Government property damage), as well as relaunch and payload replacement insurance. The package excludes coverage for those types of damages that are covered by workers compensation or employers liability insurance. We have been informed that this exclusion is standard practice in the industry.

Premium rate quotes were obtained on all elements of this insurance package during February 1988 and are considered commercially practicable, i.e., approximately 6% of the total cost of the launch service for the Government requirements and less than 10% of insured value for the other elements. The very high reliability of the launch vehicles to be used and the experience of Conatec's personnel with these launch vehicles were the major factors which enabled Conatec to acquire such reasonable premium rates. Ouotes were obtained from two separate European sources interested in providing this insurance coverage. Our broker believes that Conatec will have little problem in today's insurance marketplace in obtaining a satisfactory insurance package to meet Government requirements at acceptable premium rates. To date, liability coverage for third party liability and property damage has been available only from European insurance markets.

Even at the rates which have been quoted to Conatec, however, the purchase of additional insurance beyond that required by OCST would significantly increase Conatec's total launch cost. For example, if the "maximum possible loss" for third party liability were to be $50 Million, the premium for this extra coverage might be an additional 10-20% over the original total launch service cost. Such an increase would have a very substantial impact on the competitiveness of Conatec's launch services in relation to other providers of launch services. It is thus very important to Conatec's ability to compete that its insurance requirements not exceed those for the maximum probable loss.

IV. CONCLUSION

We strongly support the legislation before this Subcommittee and respectfully request that it be acted upon as quickly as possible. Thank you again for this opportunity to discuss these issues with you. I will be happy to try to answer any questions you may have.

Senator RIEGLE. Thank you.
Mr. Berry?

STATEMENT OF ROBERT E. BERRY, VICE PRESIDENT, SPACE SYSTEMS DIVISION, FORD AEROSPACE CORP.

Mr. BERRY. Senator Riegle, I want to also express my thanks to the subcommittee for inviting us to testify today. Ford Aerospace wants to state that the availability of an American commercial launch industry is an important element in bringing the benefits of space to the American public. We believe that enabling legislation is required to make the play-

ing field balanced between the American companies and their overseas competitors.

So I am going to submit my statement for the record and just make some comments on this subject.

The launch rocket is in fact a fundamental multiplier for the economic benefits of space. We are not in the launch rocket business. Ford Aerospace ise in the business of building satellites that go on top of those rockets and go into space to do work for the public or for the private sector. The launch rocket itself, can be likened to the generator in an electrical power system. You can do a lot of things with electricity in a town or a state, but you cannot do it if you do not have generators. You can do a lot of work in space, and the launch vehicle, the launch rocket, like the generator, is the fundamental multiplier.

What do I mean by multiplier? A modern communication satellite of the type that we build is going to be hooked up to about 100,000 antennas on the ground. That is a dramatic difference from what used to happen in the early days of communications satellites. There is a lot of work for a lot of people to build ground equipment. But, in addition, that satellite will generate by and of itself about $1 1/2 billion worth of revenues for our customer over its ten year lifetime.

Now, that means that an awful lot of people are going to be earning salaries, doing work associated with that satellite. This is going to be a tool that makes American business, American banking, American computer companies, American software companies, the American entertainment industry, to make them more competitive everywhere that they are engaged in economic activity around the world. And that satellite begins its work only if a launch vehicle is available.

Anyway, that is the impact of launch vehicles on the economy. This is an industry of the future, and this is jobs for the future, and this is making America competitive for the future. If we do not have those launch vehicles, there are only two alternatives to this legislation. One is to go back and let the Government organizations do it themselves, which John Yardley just referred to, or go overseas for this fundamental building block in this new industry.

We believe that the benefits to the American public are best provided if we create multiple avenues to space, if we make it easy for people to get to space. And we do not see anything different in this legislation than that which is available in these alternative courses of action.

So we believe that the liability, the risk of that maximum possible liability must be addressed. We find that this is a balanced bill. we believe that this does represent risk sharing.

We like other parts of the bill. We like the part that talks about competitive trade balances, and we like the part that talks about Government participation and ultimately advancing the technology.

So, in summary, we strongly support the bill before you today.

[The statement follows:]

STATEMENT OF ROBERT E. BERRY
VICE PRESIDENT AND GENERAL MANAGER
FORD AEROSPACE CORPORATION, SPACE SYSTEMS DIVISION
BEFORE THE SCIENCE, TECHNOLOGY AND SPACE SUBCOMMITTEE
OF THE SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION

MAY 17, 1988

Mr. Chairman and members of the Subcommittee:

On behalf of Ford Aerospace, a wholly owned subsidiary of Ford Motor Company, I am pleased to have the opportunity to comment on the "Commercial Space Launch Act Amendments of 1988," S.2395. This proposed legislation recognizes many policies through which the emerging U.S. commercial launch industry is at a disadvantage relative to its international competition, and provides appropriate relief. We support the provisions of this bill, and offer the following comments and observations.

Many compelling reasons exist for the U.S. Government to take a pro-active role in the development of a strong commercial launch industry. President Kennedy's foresight in recognizing space capabilities as an important element in America's future is shared by most of our fellow citizens today. Launch to orbit is the most fundamental of those capabilities. Competition among suppliers of launch services will produce technological innovation, favorable rates, customer tailored terms and conditions, and will stimulate growth of satellite-based services. The impact on jobs and tax revenues will be significant, as will the positive effect on the international balance of payments. From a strategic perspective, a healthy commercial launch capability will contribute to a more robust overall U.S. space program, providing backup for shuttle and other government launch requirements.

The Basis of Our Perspective

Ford Aerospace designs, develops, and manufactures communications satellites, weather satellites, and other spacecraft elements for the U.S. Government and for commercial applications. More than 85 spacecraft have been built in our Palo Alto, California facility. Approximately half of our business is export. As a manufacturer of space flight products, our business is closely related to the availability and affordability of reliable space transportation. This relationship assumes greater importance when our customer wants on-orbit delivery. Although Ford Aerospace recommends the services of a U.S. launch vehicle provider, competitive pressures may dictate selection of an overseas firm offering lower price service. The provisions of the Senate bill will significantly enhance the ability of the U.S. manufacturers to compete in that arena, a necessary step if we are to regain our prominence as a world leader in space transportation.

The Role of Government in Commercial Launch Services

We commend the efforts of both industry and government, which have achieved significant progress toward rebuilding a U.S. launch capability. Following government decisions to privatize expendable launch vehicles and make range and launch facilities available, the U.S. launch vehicle manufacturers displayed a willingness to face the risk of excess in the

marketplace and a faith in our government by making heavy financial commitments prior to resolution of several outstanding problem areas. Measures provided by S.2395 indicate that their faith and confidence were well placed.

The bill provides a balanced approach to liability insurance required of a licensee. It is consistent with government certification of flightworthiness and government control of range safety, including vehicle destruction by the government when necessary for public safety. Government responsibility for range safety control implies responsibility for negligence or error while performing operations associated with safety control of launch related services. It is equally appropriate that the government assure the availability of sufficient insurance for launch-associated activities.

These amendments also recognize a need for government action to assure reasonable and fair international competition in commercial space activities. Recent steps by the U.S. Trade Representative to consult with the European Space Agency regarding support of national launch systems reflect an awareness of this need. We recommend this process also be directed to Japan and the Peoples Republic of China (and the Soviet Union if for any reason current U.S. policy toward Soviet launchers should change). Arbitrary pricing by competitive foreign agencies should not be permitted to affect the commercial health of the U.S. commercial launch services industry in its vulnerable start-up phase.

In an effort to balance the international competitive equation in commercial launch services, there are strong arguments for the U.S. Government agencies to work with the U.S. launch industries to enhance their competitiveness with foreign entities, such as Arianespace and the European Space Agency. It is not clear how U.S. manufacturers can remain competitive while funding vehicle upgrades and developing new launchers without government cooperation, and it may be necessary for the U.S. Government initially to take the lead in funding new technology and development, with a mature industry later able to work with the government in much the same manner as the U.S. aircraft industry. This possibility is also foreseen and addressed by S.2395.

Conclusion

Mr. Chairman, the Senate bill adds significantly to the competitive strength of the U.S. commercial launch industry. The authors and sponsors of this legislation are to be congratulated on their understanding of the problems which must be overcome and the necessary steps to resolve them.

Again, I appreciate the opportunity to provide the views of Ford Aerospace on this important legislation.

Senator RIEGLE. Thank you, Mr. Berry.
Mr. Kenny?

STATEMENT OF DONALD G. KENNY, VICE PRESIDENT, ALEXANDER & ALEXANDER, INC.

Mr. KENNY. Thank you, Mr. Chairman.

I will likewise be much briefer than my prepared remarks which I trust will be entered into the record.

Let me make some excerpts therefrom, however, some points that I think need to be made.

Senator DANFORTH. Would you speak directly into the microphone, please, Mr. Kenny.

Mr. KENNY. Let me just take some comments from the prepared statement.

First I want to point out that Alexander & Alexander are brokers in the insurance business. We are not the users of the insurance product, nor are we the insurers. We enter this market on a regular basis on behalf of our clients to procure insurance and we provide counsel.

We think that our credibility in this marketplace is such that it enables us to give an impartial viewpoint on this matter at hand.

Let me just make two general observations about the insurance industry and then one overriding one about the space insurance market.

I think that there are two important distinctions that need to be made when we talk about the insurance business. Number one, unlike other business ventures, the insurance industry does not have the opportunity to do precise cost accounting and know beforehand what their final product costs will be. They will not know that until after the product is delivered. In the case of liability insurance, well after the product is delivered and sold.

So unlike the widget manufacturer, unlike the rocket manufacturer, when they price their product, they, the insurors, do not know their final cost, and that is an important distinction to keep in mind as we address the topic.

The other issues which are important in the insurance business, is the underwriter's function like to spread-the-risk and be able to apply the law of large number. This is very basic to the industry. They require the ability whereby we can look at the law of large numbers and we can predict with pretty good certainty how many automobiles will crash in a given year, how many lives will be lost, et cetera. I think that is extremely difficult given the small population that we are looking at in the space business.

We cannot apply the law of large numbers. We also find it very difficult to spread-the-risk. In any general insurance pool or book of business, it is basic that the loss of an individual exposure unit will have minimal impact on the entire book of business. So if you are insuring a million automobiles, the loss of one, loss of ten loss of 50 has minimal impact.

In the business which we are talking about here today is insuring perhaps 20, at most 30 launches in a given year, and we can talk later about what the pricing of that should be or will be, but let's just for argument's sake say that for the time being—the premium should be $1 million per exposure unit I am not proposing that this is the proper rating basis. So what we will be asking underwriters to do on that basis, we will be guaranteeing them, up front, at most $30 million of premium in a given year. In return, we are asking them to bear, on an individual basis, perhaps as many as 30 times a $500 million exposure.

Let's keep that in focus.

Talking about the capacities that we see, we concur with other people on the panel. We see that probably the third party liability market is somewhere between $300 million and $500 million—I cannot speak that confidently about the insurance for damage to Government property, the $100 million issue. I do not know what that market will be, and we will not know until we access the market and try to find some insurance. That will be extremely difficult to deal with.

Very briefly, the foreign competition; we have worked with the Chinese, we have worked with the French, with Arianespace. The Chinese are very, concerned about the issue. We have talked to them, with customers that were considering Chinese launches, and the Chinese are willing to provide the insurance. The liability risk is borne by the Chinese Government or the Great Wall Company.

In the case of Arianespace, as you know, they do include insurance as part of their services, and the amount of insurance there is 400 million or 440 million French francs. The Russians are talking about not charging at all for the insurance.

The only people that would have to deal with this issue are payload owners, people here in the U.S. that want to use U.S. facilities, my colleagues on the panel.

I think that is all the important excerpts from my prepared remarks.

[The statement follows:]

STATEMENT OF DONALD G. KENNY, VICE PRESIDENT, ALEXANDER & ALEXANDER, INC.

Mr. Chairman and members of the subcommittee, thank you for the opportunity to comment on the issue of launch liability and specifically on S. 2395.

As brokers, our position is one of an intermediary. We neither accept nor transfer risk. That is done by the underwriters with which we deal and our clients. From our vantage point, we feel we can speak unbiasedly and fairly on this problem confronting the industry.

My prepared remarks will be brief.

We find many merits to this bill as written.

It sets firm caps on the scope of the potential liabilities and it thereby will bring a much needed sense of stability to a commercial launch services industry in its early developmental period. It will also enhance the competitive position of that industry in comparison to foreign players.

We urge the subcommittee to vote affirmatively. We believe the space industry requires this legislation to help manage a serious insurance problem.

Having said that, let me furnish a little background and make some general observations which I hope will help bring the problem into focus and make clearer the need for this legislation.

To begin—the insurance operates a little differently than other commercial ventures. First and foremost unlike other industries, the insurers of the world have no idea what their product cost will be until after it is packaged, priced, sold and delivered to the customer.

This aspect of the insurance business is well recognized and can usually be dealt with easily. The anticipated casualty rate of automobiles, homes, factories, even human lives can be actuarially studied and predicted with a great degree of certainty. An actuary, using elementary statistical analysis, can easily calculate a proper rating base. In fact, the more individual exposure units studied, the simpler the task. The "law of large numbers" comes into play and underwriters are able to "spread the risk."

Unfortunately, actuaries are not much help when they look at the space business. Quite simply, space insurance is different from any other form of insurance. There simply is not an adequate number of exposure units to make a sound prediction in this class of business. Even the most optimistic projections do not call for more than 30 or so Western launches in any given year for the foreseeable future. Predicting how many of the millions automobiles on our highways will crash this year is not difficult. Predicting how many of these scheduled launches will fail is impossible.

Automobile manufacturers, rocket builders, widget makers, et cetera can utilize precise cost accounting methods and arrive at their true product cost before the product is sold.

Whatever class of business is involved, insurer's cost accounting methods can only estimate what the final product cost will be. If they guess wrong—they must bear the loss on that sold and delivered product. They can only hope to recoup their losses on any future sales. We need to know that there will be a future commercial space industry.

Like all businesses, insurers like to plan on profits. They hope that premium income will exceed losses paid.

By so doing, they are able to make a profit and perform a service to the industry by spreading the risk among all participants in the industry. But their function is really one of a "loss leveler." That is to say, in the end, the industry must fully expect to pay for its own losses. The insurers simply spread this cost among the various participants.

This brings us to another important observation to make about the insurance business.

In the case of automobiles, factories, even aircraft, a loss of one exposure unit is unlikely to have a severe impact on the overall book of business. That is to say, no single catastrophe will ever devour their entire book of premium.

This is not the case with the space business. There will only be 20 or 30 exposure units in a given year and even with the cap in the legislation, underwriters might stand to loose as much as $500,000,000 for each loss.

In exchange for acceptance of these risks (as many as 20 or 30 in a given year), what does the underwriter receive? How much premium income would he want to store away for that casualty that just might happen?

You can not predict what the proper rate level should be. In the end, the industry's loss experience will set the proper level.

Let's just say for the moment however, that underwriters charge $1,000,000 premium per launch. (Note, I'm not suggesting that this is a proper rate level.) On this

basis, their premium income in any given year will not exceed $30 million. It would take them over 16 hears to have sufficient premium to pay for any one loss! In that same period, they would perhaps be exposed to as many as 300 launches.

Just who are these insurers that might be willing to take these risks?

For the most part, it will be the same insurers that have supported the space business since the early bird launching in 1965. They do not now, nor did they then, have any "law of large numbers" or any actuarial rate tables to rely. on. For the most part they could only make some guesses, cross their fingers and hope that the technology was sound.

In return for this trust, these insurers have lost somewhere between $350,000,000 and $500,000,000 in space. These are dollars lost on insuring the actual space hardware.

These are for the most part, what we call "property" underwriters.

It is the "casualty" underwriters who are generally expected to pay for third party claims—liabilities.

In the case of space liabilities, we expect that these underwriters will, for the most part, be one and the same.

It is going to be extremely difficult, if not impossible, to entice casualty underwriters to enter this business with any degree of enthusiasm. It is reasonable that they would look toward the present world of space (property) underwriters and look for some commitment and leadership. With $350,000,000 in red ink, we don't forsee a lot of enthusiasm.

Lets look at what our foreign competitors are up to—the Russians are not passing away launch liability risk onto the payload owner.

The Chinese are acting in identical fashion. The liability risk is borne by the Government, not the payload owner.

Ariane requires that payload owners furnish approximately $70,000,000 in third-party launch liability insurance. As part of their one-step shopping facility, Arianespace will furnish this needed insurance at quite a manageable cost. And recognize that this does not include any liability to damage to the launch pad.

Who then is requiring third-party launch liability insurance from the launch provider? Answer—only the United States.

The three primary ELV providers now have contracts exceeding $750,000,000. At last count, something like 14 payloads have been contracted for and the greater percentage of these are foreign. You might ask the question, how has the industry managed to go ahead and sign up these customers, with no insurance market in place to handle such risks and without the benefit of this legislation?

Let me answer that from our perspective as insurance counselors/brokers. Our clients may, or may not agree. We think this is a very dangerous game indeed. To sign such contracts and to assume that the insurance industry will be there tomorrow to respond for such contractual obligations, is probably extremely optimistic at best. Long term (defined as beyond the next launch or beyond the next 12 months) there is no guarantee any insurance market will exist. We believe some sort of risk containment (via legislation such as we are discussing today) is necessary.

This brings us to the question of capacity—just how much insurance market exists today to deal with these risks?

We believe that in today's marketplace we could find somewhere between $300,000,000 and $500,000,000 worth of protection for third-party suits. This would not be an easy task.

The proposed legislation also calls for a cap of $100,000,000 for damage to Government property. We believe this might be the the most difficult piece of the insurance placement. No identified market exists today to cover such risk. When one conducts an "exposure analysis" it would seem that the probable maximum loss to Government property in the event of a launch casualty, could be anywhere between $300,000,000 (entire destruction of a launch pad) and perhaps a billion dollars plus in the event of a casualty somewhere else at the Government facility. On the other hand, $500,000,000 of protection to third party seems realistic. Perhaps even too high from an "exposure analysis" view point. Now lets run some totals.

These property underwriters we spoke of earlier will be asked to insure the payload for as much as $140,000,000. Add to this, the required $500,000,000 in launch liability protection and you have an aggregate exposure of up to $640,000,000 per launch. Until underwriters see some black ink I don't think we are today anywhere near being able to achieve this.

By most calculations, today's best guess is that worldwide capacity for the property risk is somewhere around $120 to $150,000,000.

There is today no "established" space launch liability market.

Arianespace is protected by the French Government and ESA. The Chinese and Soviets apparently assume the risk entirely. So our task within the insurance industry will be to locate or "create" such a market and in sufficient capacity to meet the industry's needs. On top of this, it must all be done at a "reasonable cost."

This is an ambitious undertaking. It is one which we believe can only be embarked upon if the industry sees some kind of strong effort by Government to help them manage and contain this risk. Otherwise we fear the fledgling U.S. commercial ELV industry could have a very short life.

I hope these comments are helpful and we urge you again to look favorably on this piece of legislation.

Senator RIEGLE. Thank you very much, Mr. Kenny.

Senator Danforth?

Senator DANFORTH. Mr. Chairman, thank you.

Gentlemen, thank you very much.

I think that two things have to be established if this legislation is going to become law. One is that but for Government indemnification, the industry will not be able to compete. And secondly, I think it has to be established that an indemnification program is not a "slippery slope" that is going to be applicable to a whole variety of industries. It is one thing to have a very targeted program that meets the "but-for" test. It is quite another thing to try to develop an indemnification mechanism which then would become the basis for, say, the whole aerospace industry, or the pharmaceutical industry, or other high risk industries.

I am not telegraphing my own position on any of those iossues, but I am just talking about the difficulty or the ease of getting a bill past Congress.

And I would welcome any comments on those two issues: the question of the degree to which this is absolutely essential for a sound, strong, competitive commercial ELV industry and, secondly, how this industry and situation can be distinguished from other industries that might seek Government indemnification. I think that it is going to be very hard for us to pass a law if it appears that this is just one step on a long, long road of indemnification.

Mr. YARDLEY. I might comment on the second part.

It is my recollection, and I will ask my counsel to verify this, that the current NASA law does clearly and explicitly provide for this indemnification, and it has been on the books for, I do not know, ten, twelve years and I have not seen any slippery slope action.

Senator DANFORTH. However, Senator Wirth, I, and others, are asking for something that is different, new legislation, to provide indemnification that does not now exist.

Mr. YARDLEY. The reason it is new is because it is in NASA's bill now, and it has got to get in somebody else's bill.

Actually, you can come up with a scenario that it could be done now with existing NASA legislation, except NASA says why should I stick my neck out? I am not launching these things any more. But authority is in there.

Senator RIEGLE. Would you yield at that point?

Senator DANFORTH. Of course.

Senator RIEGLE. I think that is a very useful point to make. But the other side of this is that, you know, we are now talking about what we hope are profit making businesses. You are not getting into this for your health or just for the exercise. You are getting in because you hope to make money, and I hope to the extent that you are successful you will make money.

And so we suddenly introduced that whole new component, and so when we have got private sector profitmaking entities going here and there is a cost of production or product cost that is associated with getting the job done, the whole question of who takes the hit for the product cost is a very important issue. There is no question about who gets the profit. If it works, the profit goes to the private sector, and it gets us back to this hybrid issue in terms of how do you privatize something that is partly private and partly public, and then how do you divvy up the cost, whether the cost is liability insurance or it is some other kind of more direct cost, and then you know, how do you divvy up the benefits?

It is inherently a mixed situation, and you know, we are trying to craft a Made in America solution here that somehow manages to cover these ambiguities. But I agree with you, this is one of many. I mean, you can pose this question but however we solve this one leads you in a sense to a next one.

Senator DANFORTH. I want to say I am for the bill.

Senator Wirth mentioned this to me several weeks ago, and I said absolutely. I think that this is a good bill. But if we are going to pass it, I think that there are two points that we must address. The first is the "but for" test and the second is the assurance that this indemnification mechanism would not then be applied to a number of other industries. I understand Mr. Kadar said that the cost of insurance is about 6 percent.

Is that right?

Mr. KADAR. For our orders that we have from DOT now, 6 percent of our launch cost.

Senator DANFORTH. Would that be typical for everybody, about 6 percent?

Mr. CHAMBERLAIN. I do not know that our cost number per se is necessarily that high, but as Mr. Yardley pointed out, it is the risk to the entire company or companies involved, that you really are essentially bidding the entire company in that small probability that if something does happen.

Senator DANFORTH. If you self-insure.

Mr. CHAMBERLAIN. Again, from a risk sharing standpoint, we have no problem taking the risk of insurance. That is available, et cetera. What we are trying to make sure is that in that very small probability case that something totally catastrophic happens, we do not lose total industries or total companies in this country.

If I can respond to the Chairman's comments, maybe a perspective would help. We are in the transportation business, and the precedents are not unlike the beginnings of either the airline industry or the rail-

road industry which both started out as Government industries that became privatized, and I think we are in the steps of trying to make that same transition. And in that infancy, we are willing to share the risk. We are willing to take the maximum insurance that the market is being defined by the Department of Transportation and is reasonably successful in the industry. There is also a process by which that number can be evaluated on a periodic basis and changed.

Senator RIEGLE. If you would just yield at that point, and if you would yield, it seems to me that that is an important parallel to draw the transportation, railroad industry in this country, but those in a sense are sort of continental, indigenous kinds of examples. We were not talking about going off the planet, and we are talking about launch capability that can occur virtually around the globe.

So we are into a different situation. We are now talking about going up against these international consortiums in other countries that are not free enterprise consortiums with the free enterprise U.S. model. And it is a different ballgame, and I do not know that there are contemporary parallels for that because that is quite different. It is not as if Ariane could have come in here, rolled a clock back and challenged us in a different way. It is a different situation.

And we have not thought our way through it, it seems to me, as a nation. We are trying to invent a way through as we go.

Mr. CHAMBERLAIN. You are asking on the sharing of the benefits as well as the risks, and I thin as Mr. Berry pointed out, there is obviously tremendous benefits, both to the populace as they use on-orbit assets, in terms of satellite and communications satellites, as well as from things like jobs in this country and balance of payments.

I think the estimates that have been put forth are something on the order of $800 million a year for the launch portion of this industry. Obviously by the time you add the satellite bills and the revenue generation, that is much more. We in 1987 did sign over $300 million worth of contracts for launch services, of which all of them were either internationally related in terms of consortia, or were to a foreign Government.

So I think the nation is sharing in the benefit, and we are just asking to share in the improbable case of sharing that risk on the maximum end.

Senator RIEGLE. Actually, I had intruded on Senator Danforth's time.

Mr. KENNY. If I might comment about the insurance market's reaction to the question that the Senator posed I do not see a slippery slope, as you called it, situation at all. It seems to me the only precedent to this—well, there might be a couple of precedents, but outside of this industry, it seems to me that in the area of the nuclear energy field, there was a young industry that did not have any idea what the liabilities were, the sky was the limit. And the Government stepped in through Price-Anderson and set some indemnification standards and set some insurance standards. That did not snowball down any slippery slope, but rather that today has come to a lessening of Government involvement in that area.

I think what we see here from my perspective in the insurance business is very, very similar situation. You have got a neophyte industry that is just struggling to get off the ground, and you have an insurance industry that has tried to participate in that effort. It has participated quite eagerly, much to its dismay, however, because in the process it has managed to lose perhaps $350 million to $500 million by supporting that industry.

I think the insurance people have taken a look at it now, and they have stepped back and they have said we want to see some stability there, we want to see some assurances that there will be successes, that there will be a chance for profit before we can proceed, and, as in the case of the nuclear industry, I think what the industry is seeking is some kind of action by Government to bring this sense of stability, that they will bring some standards that can be applied.

Senator DANFORTH. Mr. Kadar?

Mr. KADAR. I would like to make some comments on the past statements with respect to our particular program.

Research rockets typically do not orbit the earth. We go up and down. We might go up to 1,000 kilometers altitude with a 1,500 pound payload and impact within the same range boundaries. Therefore, we are a little different.

The program that we have is identical to the whole launch operation that is conducted by NASA; however we are not launching payloads that NASA launches. We are launching payloads that NASA cannot launch under its charter, the commercial payloads.

What we are doing is turning around the foreign trade deficit and bringing programs into this country and launching commercial payloads which cannot currently be launched by any U.S. Government agency.

So for the Government to support us in capping off any liabilities we might incur would really help our program. We are not replacing anything the Government is doing now. We are creating a new use of U.S. technology as developed, and as it is bleeding away to foreign users.

I have watched technologies developed here being given to foreign countries. They are using them to better their science and engineering programs, and we are not even using them here. We are taking the opportunity to apply those technologies, keep them in this country, bring the user community here, the programs here and the dollars here. This enhances our economy and our industry.

I think anything the Government does to help us along on insurance caps and that aspect are most beneficial in all ways, and any liabilities that the Government incurs for any of our programs. For instance, we are launching from the White Sands Missile Range. We are using the same system as NASA, we even have stricter requirements than NASA uses. I know, I did it for NASA. Now we have to do it for the insurance people. We have to answer to a higher authorit than NASA, DOT, and insurance companies.

What we are doing is such, that our whole company is on line. We are guaranteeing a relaunch for failure for any time that we do not attain within a three sigma mission objectives—you get a free launch.

This does not exist now. The U.S. Government launches a payload and if it fails or damages property, the Government will pay to rebuild that property and pay to relaunch the payload.

We will relaunch a payload, it is in our program, our insurance covers that cost. And any damage we do can also be done by any Government program as well as ours. At least we are covering for part of the damage.

So I do not think we are incurring additional risk to the U.S. Government or anything more than the Government is incurring today.

I totally support your bill and the House bill as long as they have all the issues in that they have right now.

Senator RIEGLE. Mr. Yardley, did you want to make a comment?

Mr. YARDLEY. Yes, let me just comment on a couple of things.

Mr. Kenny mentioned $300 to $500 million that insurance companies have lost. That is not the kind of insurance that we are talking about here. That was loss of satellites, service in orbit, launch vehicles, that sort of thing. We are not discussing that kind of insurance.

We are actually offering that in a self-insurance mode. We offer our users insurance for their launch vehicle and they pay us a premium for that. And so we are willing to do that. But that is within our resources. We are talking $50 million or something like that on a failure and not a billion, and so that is one difference.

Now, the other thing I would like to mention, just to try to put it into perspective, the risk that we are talking about, the user, the benefiter, the guy who is getting the satellite up there, should pay the insurance.

There is not a single user that we have talked to that would be willing to take the risk over the cap, not one single person. And of course, why not? Well, they could go to Ariane, they can go to the Russians, they can go to the Chinese, and all sorts of places they can go to where they do not have that problem.

So unless we take it as an aerospace company, Martin, ourselves, GD, and so on, nobody is going to take it. And it is the kind of thing that you are betting the company on, and I do not think, if this effort proves fruitless, that we are going to want to stay in this business with that kind of risk every time we go up.

And that is roughly what you said. So I just wanted to get on the record.

Senator RIEGLE. Let me ask you one thing. And just, I do not want to delay this unduly, but I want to make an analogy. We provide Federal deposit insurance for the savings and loan system, and then we regulate the savings and loan system.

We have not done a very good job of regulating them. They have gotten into trouble and now we are under water, some say $50 billion, on our way to maybe a liability of $100 billion or $150 billion. They are huge numbers. I mean, this is the worst nightmare that one can imagine because, as you say, if a one billion dollar hit basically wipes out a company, and it would in most cases, a $100 billion hit really puts a dent in our situation, especially when you and I as taxpayers are on the hook for that.

But the concept is that with the potential for big liability, that there is a regulatory structure, in place and that if it works right you prevent in certain ways the exposure from ballooning to something that is really catastrophic.

And I gather here that basically, when it comes right down to launching, I mean, again you have got certain—you have got to fit together the Air Force, if you are going to use their facilities. They have got certain requirements and so forth.

But at some point I assume that there are certain risk questions where you might have a difference of opinion, that maybe the private launch outfit feels that, you know, that they are really ready to go and maybe the Government provider of services has a different opinion and says, wait a minute, we really ought to take these additional precautions or what have you.

I do not know what your regime is for resolving those kinds of questions, because there may be some that finally, where you do not get both sides saying the same thing. But finally, you know, it is your bet and it is your payload and so forth, and you are on the hook.

But if you have got the Government there as the final insurer above the cap, you know, they are on the hook. We are on the hook as well.

Respond to that?

Mr. CHAMBERLAIN. There are two ways that that gets addressed in the commercial launch vehicle industry. The first is a licensing process that has been given to the Department of Transportation as part of their charter, to license both the launch vehicle and the range and to approve the satellite that will be launched on it.

Secondly is the range itself, which is run by the United States Air Force, and they are the law. The person with his finger on the button is an Air Force person, and that person has always been and as far as I can tell in the foreseeable future always will be a person who has that final authority.

We must satisfy the range and the Department of Transportation that our mission is sound, that our vehicle is ready to go, and we do meet the range safety requirements, et cetera. And so I do not think anything has been altered in respect to the way we have developed the industry through the Government side.

Those are still in place and that is part of the support that we pay for when we use that range and have that right to use granted to us by the United States Air Force.

Senator RIEGLE. So even in an extreme case, not just where they say, we do not want you to launch today, we are going to wait for better conditions, if they decided sort of at the end of a procedure that a mistake was made and that somehow you had to tear down a rocket and put it all back together again and lose six months or lose eight months or whatever, there is no question about their power to do that and your willingness to accede to their insisting that they do that?

There are no situations that could arise where you would have a difference of opinion? As a private sector outfit, you are saying, look, we are ready to go and we are ready to go?

Mr. YARDLEY. We cannot think of one offhand, although we have not made an exhaustive search and those situations have not been done in real time. But our plan is to launch just exactly like it was a Government launch.

You see, the Air Force has given us a contract for this vehicle to launch a bunch of their payloads on it. We have to schedule their payloads and the commercial payloads, and we have the same launch crew and the same Air Force people and the same range safety people.

And so we see little likelihood of that happening. Now, I do not know what the fine print reads.

Mr. CHAMBERLAIN. I think when the fine print comes down, the Air Force runs the range and they have the authority to halt whatever appears to be wrong.

Mr. YARDLEY. Now, the NASA guy this morning implied that was not the case, that now that this is all commercial it is all—everybody can do anything they want to do. But in all fairness, NASA is not involved in this commercialization. It is all Air Force.

Senator WIRTH. Mr. Chairman, if I might, let me ask a couple of summary questions.

One, it seems to me Mr. Berry was the person who said there were only two alternatives. One is that the Government do it and the second is to go overseas. Is that a correct summary?

Mr. BERRY. Yes, sir.

Senator WIRTH. Do you all agree with that? Mr. Kadar?

Mr. KADAR. Basically, that is what we are faced with. We look at two alternatives.

Senator WIRTH. What is the difference in yes and basically this is what we are faced with?

Mr. KADAR. We have identified two alternatives which we are faced with. We can assume the risk of anything above most probable loss or buy more insurance. Doing either of those is unacceptable. By buying more insurance, we put ourselves out of the competitive price list for commercial services. By taking the extra risk, on the other hand, we have to pass that on to our customer and they will go to launch from a European range.

So yes, we will lose.

Senator WIRTH. Mr. Yardley, do you agree with that?

Mr. YARDLEY. Well, he has got a little different problem, in that he can buy more insurance and we cannot. In other words, we are buying the maximum that the industry will sell us.

Senator WIRTH. Mr. Kadar can buy insurance, but you cannot, is that right?

Mr. YARDLEY. Yes.

Senator WIRTH. So you agree with Mr. Berry's statement? It is yes, is that right, Mr. Chamberlain?

Mr. CHAMBERLAIN. Yes.

Senator WIRTH. You heard the first panel this morning from NASA and the Air Force and the Department of Transportation, and the thrust of their testimony is that they do not believe that. Is that not right?

Mr. YARDLEY. Yes. Well, they do not have anything at risk.

Senator WIRTH. But they are saying, when asked by, I believe, Senator Danforth, and then asked by me about what happens to the industry in its competitive position internationally, they seemed to think that it was going to be okay, that these cries of alarm were not valid.

I mean, that is a paraphrase of an hour of testimony from them. How do you answer, or how do we pin that down? It seems that that goes to Senator Danforth's first question that has to be resolved.

You all are claiming one thing. The Administration says, well, I do not think that that is going to happen.

Mr. YARDLEY. What the Administration is saying is they think we will be willing to take the risk, and that is our decision, not theirs. It is just that simple.

Mr. CHAMBERLAIN. They also said there have been no cases the other way. When there are only three of you, you hate to wait until one of you pulls out before you decide, now I have a data point.

Senator WIRTH. It seems to me it is appropriate, Mr. Chairman, that we might ask the witnesses to look at the testimony and the transcript, the statements of the Administration. And they are making all of the arguments that say we should not as a Government get into this, right? They do not believe that the industry is threatened and will either go back to the Government or will go offshore.

And secondly, I think that they are making the case that theoretically or economically they do not think this is the sort of thing the Government should get into. And we have got to have a clear response from all of you who live with this to precisely what it is they are arguing.

Mr. KADAR. Well, they more or less implied that, if there should be a situation during a launch activity where someone is liable, when the Government runs a program no one is liable and it seems to me no one bears any cost. Someone has to pay for losses, whether it is in a commercial launch or a Government launch.

Senator WIRTH. Maybe we can ask you for the record to look at the arguments that they are making, which are the arguments that—one of the arguments, sets of arguments that we are going to face on the floor.

The other is the slippery slope argument that Senator Danforth brought up, I think: What other industry is like this?

Mr. Berry?

Mr. BERRY. Well, I was not prepared to answer that particular question, but I think that we can find them. I wanted to point out in this——

Senator WIRTH. This is not for the operations, as you have reflected, Mr. Kenny, in your comment that we are into the business of losing on insurance for what happens in a satellite or it does not last as long as we think it is going to, or so on.

This is fundamentally focused on two areas, is it not? What happens at the launch site if something were to transpire and what happens after launch if that vehicle were to drop down into Flint, Michigan, or wherever it might be and cause a lot of havoc.

All right, what is the liability in those two areas? That is fundamentally what we are talking about, is it not?

Mr. BERRY. Yes.

Senator WIRTH. What other industry is like this, that has that kind of very large one-time risk?

Mr. BERRY. It would seem to me you would look at something like the commercial nuclear power generation industry.

But the other part of this, I find it difficult to find an industry exactly like this, because this industry is buying services from the Government. And if you look at what services are they buying, they are largely in the area of public safety.

The Government is setting the ground rules by which the use of the Government facilities can be employed. All the safety procedures that could take place within the framework of those Government ranges are Government safety procedures. Then you have a Government employee using equipment that I believe is designed to Government standards, that is this command destruct equipment.

I believe that is designed to Government standards which are put forth by the Government, and you have a Government employee actually flying the vehicle, deciding whether or not to carry out the public safety requirements that are all determined by the Government.

So I see an industry here in which the Government has its hand directly involved in operations affecting public safety, which I do not see in many other industries.

Senator WIRTH. Part of the answer to the slippery slope question is there is nothing else like this, is that not right? I mean, it seems to me that it is not as if this is being engaged in a whole lot of other things, like we are going to insure panel trucks driving down the highway or whatever it may be, that this is a foot in the door or nose under the tent for all kinds of things.

There is a uniqueness to what we are talking about in this industry and its liabilities, is that not the case? And Mr. Kenny, you are the insurance expert.

Mr. KENNY. For the record, I know of no other industry that has this huge catastrophe exposure and potentially has no insurance market in place to deal with it.

Senator WIRTH. And all of your competitors have effectively their Governments offering this indemnification/ insurance, is that not right?

Mr. KENNY. That is correct. That is what I see from my perspective.

Senator WIRTH. Finally, going back to Mr. Berry's question, in order to keep this from either going to the Government or going offshore, we have to be in a competitive position with those other operators, with those other countries.

Is that right?

Mr. BERRY. Exactly, Senator Wirth. And to me the alternative of the Government doing it means that in order to bring the benefits of space to the American public, we would then come forward and say, "please appropriate the money and tax us to allow the Government to offer these kinds of services."

And maybe the Government industrial organization will find a way to be competitive, maybe it will not.

Senator WIRTH. Is it logical then that we would expect you all to say that if this legislation does not pass you are getting out of the business?

Mr. BERRY. Well, I would expect that you certainly would not find new entrants.

Senator WIRTH. That is not quite the same thing. You are saying to me the only two alternatives to this legislation are the Government doing it or going overseas. So therefore, a logical question to follow that is, if the legislation does not pass it will either go to the Government or go overseas.

Mr. YARDLEY. Or get better insurance. This insurance thing has been kind of mushy for the last year or two. I do not know, they may come up with a billion and a half in the next year. But that is a possibility.

Mr. KENNY. As respects the purchase of insurance as an option, I see that as a very weak, perhaps third option. I talked about the property insurance results. I talked about the fact that underwriters lost between $300 million and $50 million insuring the satellites and the payloads.

Because of that very massive amount of red ink which occurred, over a very short span of time, I can speak with certainty that if we try to approach the liability insurance market today, which is the market we would need to approach to procure this insurance, that they would necessarily turn to their brethren that have been insuring the space exposures in the last ten years or so, and these brethren have lost almost $500 million.

So they are not going to be very optimistic. They are not going to be very enthusiastic.

I see that, in the absence of this legislation, extreme difficulty in procuring the kinds of liability insurances that might be required.

Senator WIRTH. You see, this is I think the fundamental difference between you all and the Administration. What they are saying, I gather earlier, is that this is not so big a problem. They are saying they can effectively go out and get their own insurance, which means you have to be in a position of saying, we cannot do that, and to pin that down quite specifically in order to be able to answer those questions which are going to come up with this bill comes to markup on the floor.

Mr. KADAR. Well, does not the Government indemnify itself for its own launch operations right now for third party liability and property damage?

Senator RIEGLE. But I think, if you would yield, there is one thing we have left out here, and that is that when the Government does it the Government basically is responsible from A to Z. They put the design of the rocket together. They monitor the manufacturing process. There is a whole series of cross-connects from the beginning through every step.

You I do not think have that to the same degree, now that we are going into the private sector business. I cannot imagine that you are going to want to have that, quite frankly.

Mr. KADAR. We have it more.

Mr. YARDLEY. Some do and some do not.

Senator RIEGLE. Well, I would think that that is probably a more accurate answer. Some do and some do not. But the point is it is different.

I think you can turn Mr. Kenny's point around and say that, if the private insurers are looking at their recent loss history and they are saying, we have taken a bath, $500 million, whatever the figure is, we do not think we want to touch this, that is another way of another part of the private enterprise system saying, hey, wait a minute, there is a problem out here, at least we project a problem. Otherwise, we would be happy to write the business and take the premiums and bank those profits.

We think there is a risk out here that is larger than we have got the stomach for, and so we think there is a problem. We think there potentially is a big problem, and this is why. And we are in the business of taking down risk policies for big problems, but we do not want to touch that one above a certain point.

So I think that in a certain sense says that there is potentially a problem out here, and that in fact we need bigger shoulders to put it on. And we decided the bigger shoulders to put it on are the Government. At least that is the position of those of you at the table.

The Government witnesses who were here on the other side, you know, and they spoke from different vantage points, but they said, we do not want to shoulder that risk.

But it sounds to me as if one can make a plausible argument that in fact we are talking about what is perceived to be a real risk. This is not a figment of somebody's imagination, or if it were I think the insurance folks would be very quick to step forward and say: You want that policy; here it is.

Mr. KENNY. I think you stated that very clearly, Mr. Chairman. The only thing I would add to that is that those voices that say that there potentially is sufficient market out there to handle that risk perhaps also do not recognize another fact, and that is that we would be entering the market to buy that insurance at the same time that the payload owners would be entering the market to buy the property insurance that they require.

And even by some conservative cost estimates, payload owners today can probably justify as high as $150 to $175 million of insurance need. So when you tack that exposure onto the liability exposure, you put the two together, it is a number that simply cannot be achieved in today's insurance market. That is a fact.

Senator RIEGLE. I think that is an important fact.

Mr. KADAR. I think it is essential to differentiate between all of the insurance elements associated with the commercial launch program. What the Government wants for use of the launch range is property damage and third party liability. Once you lift off the launch pad and move down range out of the populated areas, you start getting into other elements of insurance.

You have passed what the Government wants insured. You are not going to damage the Government property. You have left it, you have lifted off.

Mr. YARDLEY. They are worried about third party liability.

Mr. CHAMBERLAIN. Again, we need to make a distinction between the types of insurance and the probability of occurrence. As has been demonstrated in the history of launching satellites and the operation of satellites, there is somewhere in the 90 to 95 percent probable success. That means a failure rate of some five to ten percent, and that is an insurance that is maturing with the industry and needs some successes under its belt to get comfortable with its capacity.

Again, the types of insurance we are talking about from a third party liability goes into how many zeroes do you put behind the decimal point before you have a probability of occurrence. And that is what we have pointed out has never had a claim filed against it to date.

So the probability of these occurrences are totally different, and I do not want to confuse the two. That is saying one insurance market is trying to insure the same things. They are not.

Our only request is that we are willing to work with the insurance industry, which develops a little bit slower than the hardware side, and that we have to be making our plans three to five years ahead of time. The insurance market typically contracts three to six months prior to launches, so there is naturally a time lag between those two.

And I think that that market will come along. But right now, you are asking a risk over and above the dollars that are available. And whether it is $300 million or $500 million is not as important as the fact that we are willing to take that risk and share that.

But it is the unbounded highly improbable occurrence that we are asking, so that we do not lose major industries in this country.

Senator RIEGLE. Gentlemen, let me thank you for your testimony today.

I want everyone here to know that in 1985 the committee had the Congressional Research Service do a report on insurance and space commercialization, and in light of the fact that this issue is now very much before us, the committee has asked the Congressional Research Service to update that report to help members look at this. And that report will be ready and released in early June. So that is coming down the track.

We will have additional questions, as I said, for you from the committee and members who were not able to be here.

Senator WIRTH. Mr. Chairman, maybe we could, while we are waiting for the CRS report to come back, we could ask you all to answer the questions raised by the Administration this morning.

It seems to me that is summarized by Mr. Berry's statement that if we do not have this legislation, we go back to the Government or go offshore. Then there is the fuzzy area raised, well, maybe there is a third alternative of getting your own insurance, and that is the area of disagreement with the Administration.

They seem to think that there is some other way in which you could approach this, and you are saying realistically there is not. It seems to me that is the difference, and what I am trying to do is to fish for a way in which we can get the Administration, either smoke them out from their position or recognize that maybe the points that they are making are valid and the legislation is not needed.

I obviously, having spent a lot of time in helping to write this piece of legislation, I think that it is needed and I think that this is an important step to do. But we have got to answer those questions.

So maybe we could ask all of you to answer those between now and the time that we come back on this in early June.

Thank you, MR. Chairman.

Senator RIEGLE. Gentlemen, thank you very much.

The committee is in adjournment.

[Whereupon, at 12:25 p.m., the subcommittee was adjourned.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

STATEMENT OF JAMES W. BARRETT, PRESIDENT, INTERNATIONAL TECHNOLOGY UNDERWRITERS

As President of International Technology Underwriters (INTEC), I appreciate the opportunity to submit these comments on S. 2395, the Commercial Space Launch Act Amendments of 1988.

INTEC is the largest insurer of space risks. We are, therefore, vitally interested in S. 2395, particularly those provisions of the bill which specify the insurance requirements for U.S. commercial launch providers licensed by the Department of Transportation.

INTEC strongly supports the development of a vigorous U.S. commercial space transportation industry and fully recognizes that the viability of that industry, particularly in its early years, will be dependent upon the availability of substantial and reasonably-priced private insurance protection. We also believe that governmental excess-of-insurance protection is critical to the survival of the U.S. commercial space transportation industry. This protection against the so-called maximum possible loss, which could well exceed reasonably available insurance capacity, is essential if the U.S. commercial launch effort is to be assured of a competitive posture vis-a-vis foreign launch service providers such as Arianespace, the European provider of launch services. S. 2395 would provide such protection to commercial launch service providers, as well as to the public, in the event injuries or damages resulting from a commercial launch exceed available insurance or other private financial protection.

As I know you are aware, a key first step in obtaining broad-based support for S. 2395 is to ensure prospective supporters that there is substantial private financial protection available in the world market and, therefore, the Government's responsibility for claims would arise only in the unlikely event of a catastrophic incident where resulting injuries and damages exceed such private financial protection. INTEC is keenly interested in participating in the challenge of providing such private financial protection.

Technology Risk Administrators, a sister company of INTEC, is in the process of establishing a centrally-managed underwriting facility which would provide, on a cost-effective basis, optimum and dependable insurance protection. I feel confident that this underwriting facility could achieve more than $500 million and as much as $750 to 1 billion of public liability insurance capacity for launch risks given today's market conditions, recognizing, of course, that a change in market conditions could reduce available capacity. However, in periods of restricted capacity, for example, following a major loss, a facility offers the best potential for maintaining the highest levels of capacity. A centrally managed underwriting facility can enhance market stability, particularly in the underwriting of high technology space risks, and thereby better ensure continuity in the protection of the industry, the public and the Government. I also believe the Facility could provide substantial capacity to cover the risk assumed by the U.S. launch industry for damage to Government property.

These convictions bring me to a proposal with respect to *Section 4. Insurance Requirements of Licensee* of S. 2395. Under this section of the bill, the Secretary of Transportation is required to determine the "maximum probable" loss that could result from a launch, and the licensee furnishing that launch is then required to demonstrate it has sufficient private financial protection, e.g., insurance, to compensate claims that could arise from the maximum probable loss including claims against the Government as a cost-free named insured. However, if the Secretary should find that the maximum probable loss, in the case of public liability claims, would exceed $500 million, the licensee is not required to obtain liability insurance, or demonstrate other private financial protection, to compensate such losses that might exceed $500 million. This limit would apply even though insurance is available at reasonable cost to cover losses in excess of $500 million. These losses—in excess of the $500 million—would be paid by the Government, presumably at taxpayer expense.

I am very concerned that this cap on private insurance protection will have negative consequences, first, with respect to additional support from those who may conclude that tax dollars should not be utilized as a substitute for reasonably available private financial protection and, second, with respect to the insurance market. A statutory cap on private insurance can be viewed by underwriters as a disincentive to optimize insurance capacity in support of the U.S. commercial launch industry. Further, such a cap would directly conflict with the well-established policy that any Government indemnity should not compete with the activities of private insurers. This principle was explicitly reflected in the Price Anderson Act of 1957 (Act of September 2, 1957, Public Law No. 85–256, 71 Stat. 576–77, as amended, 42 U.S.C. 2110 (1970)), and, more recently, in the NASA Authorization Act (Public Law No. 96–48, October 1, 1979, 42 U.S.C. 2455b).

I would like to suggest an alternative to the insurance cap. Specifically, any Government protection should be provided only if, and to the extent, reasonably-available insurance capacity cannot be obtained to cover the "maximum probable" loss as determined by the Secretary of Transportaion.

The application of this approach can be illustrated by the following example: if the maximum probable loss or damage to the public is estimated to be $600 million, and $600 million of liability insurance (or equivalent private financial protection) is available at reasonable cost, the licensee must obtain that amount of private protection, and the Government's obligation to furnish financial protection, e.g., indemnity, only arises in the unlikely event public liability exceeds the $600 million. As noted above, the difference embodied in Sec. 4 of S. 2395 is that the licensee, in the forgoing example, would not be required to secure more than $500 million of insurance or other financial protection even though the additional $100 million of private protection were available at reasonable cost. Thus, if the maximum probable loss actually occurred, the Government's obligation to indemnify the licensee would start with the first dollar in excess of $500 million, rather than $600 million, with the result that tax dollars would be committed in lieu of reasonably available private financial protection.

I believe this particular aspect of the bill requires further and critical consideration. My concern is that it may disable an otherwise justifiable, and necessary, legislative solution to the excess-of-insurance liability risks faced by the U.S. commercial space transportation industry. These risks must be contained if the U.S. is to move ahead in space in reliance in any significant part on private risk capital investment.

I sincerely appreciate the opportunity to submit these comments on S. 2395. The Bill is of critical importance to establishing an economically viable and competitive U.S. commercial space transportation industry, which, in turn, is vital to regaining and maintaining U.S. leadership in space transportation. The changes to Sec. 4 of the Bill, which I propose, will not only reduce taxpayer exposure, but will permit and encourage private insurance participation in underwriting space risks generally.

STATEMENT OF EUGENE F. MURPHY

Chairman Riegle and members of the Subcommittee: my name is Eugene F. Murphy. I am Senior Vice President of General Electric Company, with responsibility for GE Communications & Services. I appreciate the opportunity to submit these comments for the record on S.2395 to give the Subcommittee a user's perspective.

GE AMERICOM

One of the components of GE Communications & Services is GE American Communications Co. ("GE Americom"). GE Americom pioneered the successful use of domestic communications satellites and now operates five C-band and two Ku-band in-orbit satellites. These satellites are primarily used to provide video and audio services as well as services to the government.

GE Americom used NASA to launch its first Satcom C-band satellite in 1975, on a Delta launcher; and, of the subsequent nine satellites we have launched, seven C-band satellites have used NASA's Delta launcher. The two Ku-band satellites were launched on the Space Shuttle.

Construction is complete on an eighth C-band satellite. Depending on our plans for the use of this satellite, we hope to be able to launch it in the 1989-1999 time frame. Construction is well underway on two high-technology Ku-band satellites, the first of which is scheduled to be ready for launch in June 1989. Because some of our first-generation C-band satellites will be reaching the end of their lifetimes between 1991 and 1995, we must consider their replacements as well. Additionally, we have applied to the FCC for authority to launch one "hybrid" C and Ku-band satellite.

DOMESTIC ELV INDUSTRY

As a satellite carrier, GE Americom has an important stake in the free availability of launch services. Because the multi-million dollar cost of launch services are costs that we must recover from our customers, this is an important matter for end-users as well.

In particular, we need to have available a variety of launching facilities at competitive rates, and we are hopeful that Congress will take the actions to make this a reality.

In the past, where NASA both acquired the hardware and performed the launch services on expendable launch vehicles (ELVs), satellite operators enjoyed reasonably-priced and flexible ways of placing satellites reliably into orbit.

NASA's subsequent decision to use the Space Shuttle as its exclusive means of launching commercial satellites, on the other hand, caused a problem for the ELV industry. In order to concentrate its resources on the Shuttle, NASA ceased to acquire all but a handful of ELVs. ELV production lines stalled with no access to NASA's facilities and services.

The loss of the Challenger and the continuing stand-down of the Shuttle program, combined with the Administration's decision to bar commercial payloads from future Shuttle missions and the long lead times necessary to book space on U.S. ELVs, left domestic satellite operators with few launch alternatives.

As a result, many commercial satellite operators were forced to turn to offshore launch services? Because of the impossibility of obtaining a private U.S. launch in the wake of the Challenger loss, a joint venture involving GE Americom, for example, had arranged to have our first-high-power Ku-band satellite launched on Ariane, as did many other satellite operators.

We are aware that the outlook for private U.S. space launching facilities has improved recently. We are hopeful that, over the long run, competition among U.S. firms will result in the pass-through to users of the cost savings resulted from production lines. This will, in turn, assure that the cost of satellite services remains reasonable for our customers.

We are pleased that the Administration, in its "Space Policy and Commercial Space Initiative to Begin the Next Century" has committed federal agencies to procure existing and future launch services from private companies. This will help re-start stalled production lines and reduce the cost of private launches.

We disagree with the Administration's decision to restrict NASA to government launches only, since this will mean that its hard-won expertise in this area will be lost to the revitalization of space launching. But this is neither the time or place to dispute such a decision. Instead, I would like to focus the remainder of my testimony on the highlights of S. 2395.

INSURANCE

Space launching is a high-risk activity; and, because it is only prudent for an operator to take out insurance to guard against potentially catastrophic accidents, the cost of insurance is one of those elements passed on to users by a commercial ELV company.

The insurance arrangements under NASA were commercially reasonable. Each party involved in the launch agreed to be responsible for its own damages, regardless of fault and agreed not to sue the other parties for losses incurred as a result of injury or death of its own employees, again regardless of fault. To protect against third-party liabilities, satellite operators were required to take any insurance to guard against $500 million of loss; and NASA assumed the risk of claims beyond this level.

S 2395 would continue these risk-sharing arrangements. There would be cross-waivers among all parties, whereby each party would assume responsibility, regardless of fault, for damage to its property and for losses occurred as a result of injury or death of its employees. Launch companies would assume liability for "maximum probable loss" to the public up to a maximum dollar amount of $500 million, while the government would assume the risk of claims in excess of this amount.

Such provisions would put U.S. launches more on a par with offshore companies. For example, commercial satellite firms using Arianespace are held harmless from both claims from public liability and damage to government property in excess of 400 million French Francs (approximately $70 million).

Under S. 2395, by comparison, licensees must also acquire separate insurance or demonstrate financial responsibility for damage to government facilities, up to $100 million. This is a departure from NASA practices, whereby the government assumed responsibility for all damage to its own facilities, and will result in incrementally higher launch fees than are available from Ariane. We believe that the legislation should require cross-waivers of liability in this instance as well. This would be consistent with prior NASA practice and would aid in supporting a vigorous and competitive private ELV industry as a national asset.

DEFINITION OF DIRECT COSTS

Another important contribution of S. 2395 is defining "direct costs" that ELV operators will have to pay for use of federal launching and range facilities as "the actual costs that can be unambiguously associated with a commercial launch effort, and would not be borne by the United States Government in the absence of a commercial launch effort."

The costs a commercial launch operator must pay for access to government facilities and launch services are an important factor, since these are directly reflected in what ELV companies charge commercial satellite services for a launch. We have always maintained that government facility and service rates must be set on an additive basis, in that they should only cover those costs over and above the user's activities. We believe that S. 2395's definition of "direct costs" meets this criterion.

○

87-608 (88)